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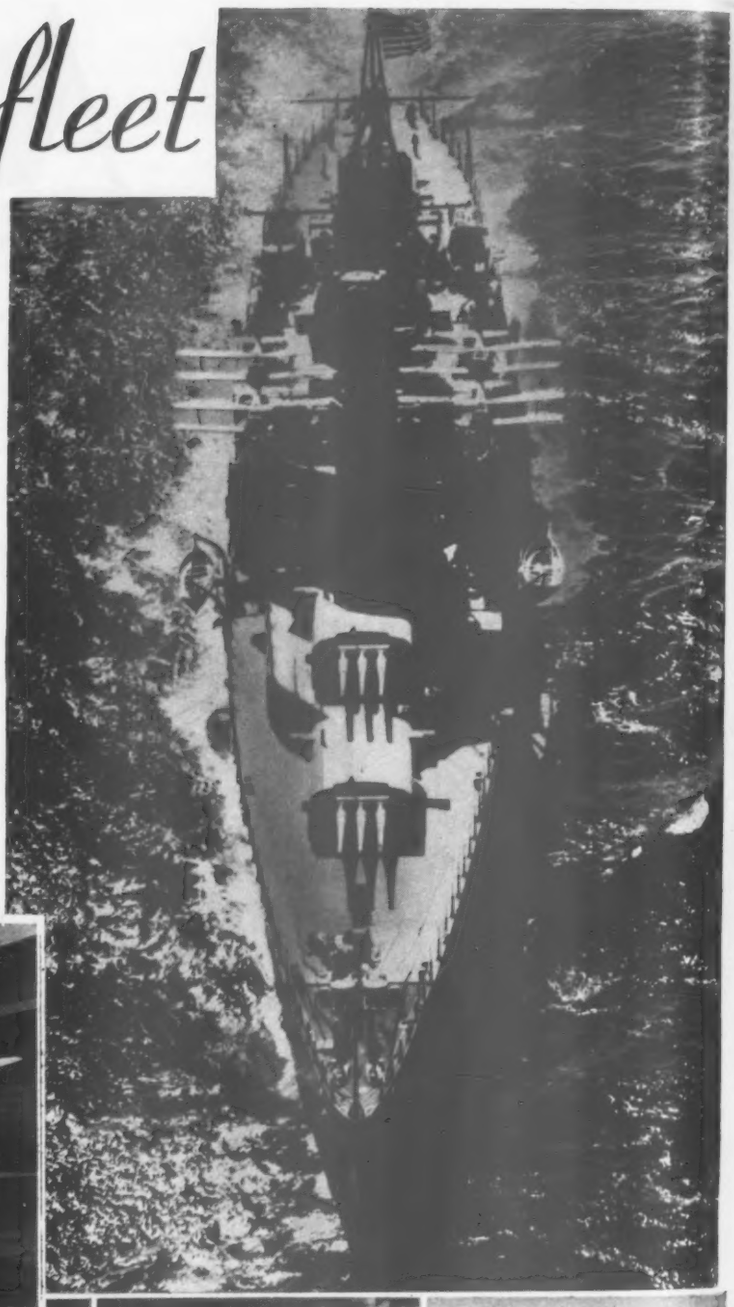
With the fleet



IN seventeen years of continuous service with the Navy, Vought Corsairs have seen the importance of aircraft to National Defense steadily increasing. Roaring off carrier decks, shooting from battleship catapults, pounding through sea and spray, the Corsairs are an indispensable part of the Fleet. The latest SBU-1 Scout-Bomber brings new performance standards to the traditional reliability and endurance of the Corsairs in Naval service.

CHANCE VOUGHT AIRCRAFT
Division of
United Aircraft Manufacturing Corp.
East Hartford, Connecticut

Official Photo U. S. Navy

Vought Corsairs

AVIATION

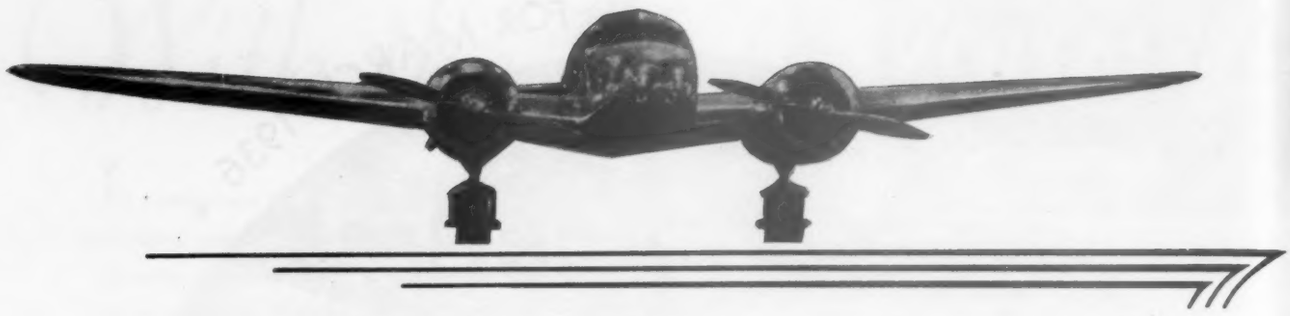
FOR MARCH 1936

AIRPLANES
ENGINES
ACCESSORIES

SHOW IN PRINT

• THE WEST COAST has had its aircraft show and it was a very creditable performance. We came away with more enthusiasm for such exhibitions than we have been able to drum up for many a year—an enthusiasm that was shared by most of the exhibitors. The feeling that "we're here because we're here," characteristic of some recent shows, was not in evidence at Los Angeles. Congratulations to the sponsors which we voiced last month as the show opened will bear repeating. It was a good job.

Now with a new spring buying season just around the corner, AVIATION is having its own aircraft exhibition, a national show in print, a presentation of What's What in American Aeronautics. Included are the exhibtors at Los Angeles, plus every concern known to us that serves the aeronautical industry. We present as a desk-tool, as a guide to all those interested in aircraft and accessories, a complete directory of the industry, including details and specifications for all aircraft and aircraft engines now commercially obtainable in America, and a survey of available materials, parts, and accessories.



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AERONCA C-3

Aeronautical Corporation of America Cincinnati, Ohio*

MISSIONARIES, commuters, injured Indians, rough diamonds and payroll cash are a few of the things that have traveled by Aeronca in various parts of the Western Hemisphere. The Reverend Father J. M. Coulture, flying priest of Canada, has flown more than 50,000 miles in his ski-equipped ship. George Hight, of Belle Fourche, S. D., has made a number of mercy flights between his profitable coyote shooting expeditions. In South America, Aeroncas shuttle back and forth between cities and diamond mines and are used extensively on Brazilian coffee plantations.

The latest Aeronca C-3s are larger and more roomy than their predecessors, and have been cleaned up considerably in design. Side-by-side seating arrangements and other characteristic features have been retained.

Specifications: seats, 2; rated horsepower, 36; gross weight, 1,006 lb.; useful load, 437 lb.; maximum speed, 93 m.p.h.; range, 200 miles.

**Officers of the company are listed in column 2.*

AERONCA C-70, C-85

Aeronautical Corporation of America Cincinnati, Ohio

LAST year the Aeronautical Corporation of America sensed the need for a cabin ship faster than the C-3 and introduced the low-wing C-70 and C-85 models which differ mainly in power plant. Regular equipment is the LeBlond 70 hp. engine, but the plane has been licensed to take other power plants up to 90 hp., including the 85 hp. LeBlond and the 90 hp. Warner Scarab, Jr.

The Aeronca low-wing has been designed for advanced training and private flying. Provision is made for 150 lb. of baggage.

Specifications: seats, 2, rated horsepower, 70-85; gross weight, 1,680 lb.; useful load, 655-665 lb.; maximum speed, 115-120 m.p.h.; range, 500 miles.

Officers of the Aeronautical Corp. of America are: Taylor Stanley, president; H. V. Fetick, vice-president; H. V. Fetick, treasurer; Robert A. Taft, secretary; J. C. Welsch, sales manager; R. E. Schlemmer, chief engineer; C. S. McKenzie, general manager.

VULTEE VI-A

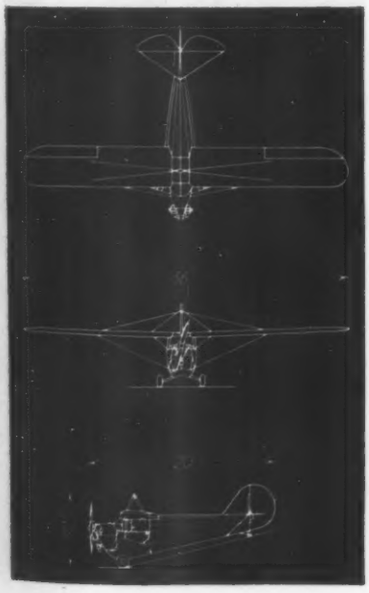
Airplane Development Corporation Glendale, Cal.

WHERE high-speed, single-engine transport equipment is required, the Vultee VI-A has found extensive application. A number of these ships also have been built for executive travel.

In addition to its high performance, the Vultee VI-A is noteworthy particularly because of its unique structure, which provides simplicity of manufacture and maintenance. The fuselage is a true monocouque without longitudinal stringers and made up of a series of overlapping flat sheets whose long dimensions run transverse to the longitudinal axis. Wing construction is of the shell type and the tail surface construction is similar to that of the wings. Landing gear retraction is accomplished by means of an electrically operated mechanism.

Specifications: seats, 10; horsepower, 735; gross weight, 8,500 lb.; useful load, 3,193 lb.; maximum speed, 225 m.p.h. (4,100 ft.); range, 1,000 miles.

Officers of the company are: Don P. Smith, president, and Gerard F. Vultee, vice-president and chief engineer.



See also specification table on page 82

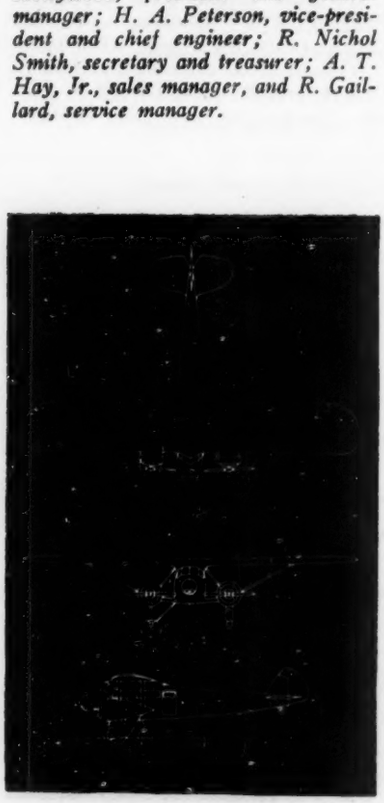
AIR TRANSPORT T, B, P

Air Transport Manufacturing Company, Glendale, Cal.

AIRPLANES with one, two, and three engines are offered by the Air Transport Manufacturing Company. The single engined P-2 is a Kinner powered trainer. Specifications: number of seats, 2; horsepower, 100; gross weight, 1,650 lb.; useful load, 630 lb.; maximum speed, 130 m.p.h. (1,000 ft.); range, 450 miles.

The B-6 and B-6S models are twin Wright Whirlwind powered, six-place land or seaplanes. Specifications are: number of seats, 6; horsepower, 250; gross weight, 5,000 lb.; useful load, (seaplane) 1,780 lb., (landplane) 1,883 lb.; maximum speed (seaplane) 180 m.p.h. at 7,000 ft.; (landplane) 190 m.p.h. at 7,000 ft.; range (seaplane) 450 miles; (landplane) 500 miles. A three-engined version—the Model T-6, also available.

Officers of the company are: E. L. Hollywood, president and general manager; H. A. Peterson, vice-president and chief engineer; R. Nichol Smith, secretary and treasurer; A. T. Hay, Jr., sales manager, and R. Gaillard, service manager.



AMERICAN EAGLET B-32

American Eagle-Lincoln Aircraft Corporation, Kansas City, Kan.

ONE of the few low-priced airplanes to survive the depression period is the American Eaglet. Together with the TP biplane it has been in production continuously for several years. The company is the result of a merger between the Old American Eagle Aircraft Corporation and the Lincoln Aircraft Company, and it maintains service on all of their fifteen old models.

Regular power for the Eaglet is the Szekeley SR-3-0, three-cylinder, 45 hp. engine. Special features of equipment include a simple bungee stabilizing system and complete dual controls. Additional equipment at no increase in price includes Pyrene fire extinguisher, first aid kit, log books, two safety belts, two seat cushions and windshield.

Number of seats, 2; horsepower, 45; gross weight, 922 lb.; useful load, 413 lb.; maximum speed, 90 m.p.h.; range, 250 miles.

Officers are Victor Roos, president; W. B. Williams, vice-president; Ervin E. Rohlff, secretary; Victor H. Roos, treasurer, and M. P. Crews, chief engineer.

ARGONAUT PIRATE

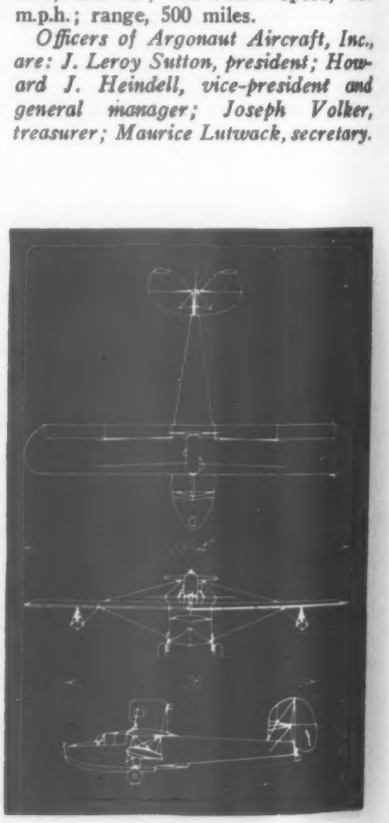
Argonaut Aircraft, Inc. North Tonawanda, N. Y.

A SOURCE of discouragement to the private flyer has been the recent scarcity of low-priced amphibians. Argonaut Aircraft has set out to do something about it. Although designed primarily for the sportsman-pilot, the Argonaut Pirate has a wide breadth of purposes and applications in commercial operation. It has been designed for the Menasco Pirate C-4 engine (four-cylinder inverted, 125 hp.), mounted as a pusher above the center section.

The 54 in. beam at the cabin provides ample room for passengers to sit side by side, but the seats are arranged in clover-leaf formation, side-by-side forward, a third seat behind.

Number of seats, 3; horsepower, 125; gross weight, 2,225 lb.; useful load, 875 lb.; maximum speed, 100 m.p.h.; range, 500 miles.

Officers of Argonaut Aircraft, Inc., are: J. Leroy Sutton, president; Howard J. Heindell, vice-president and general manager; Joseph Volker, treasurer; Maurice Lutwack, secretary.



See also specification table on page 88

BEECH B17L, B17B, B17R

*Beech Aircraft Company**
Wichita, Kan.

THE smallest Beechcraft is the Model B17L powered with the 225 hp. Jacobs engine. General specifications: Number of seats, 4; horsepower, 225; gross weight, 2,943 lb.; useful load, 1,143 lb.; maximum speed 175 m.p.h. (7,200 ft.); range 550 miles. Similar in dimensions is the Model B17B Beechcraft with L-5 Jacobs. General specifications are: Number of seats, 4; horsepower, 285; gross weight, 3,150 lb.; useful load, 1,300 lb.; maximum speed, 177 m.p.h. at 7,200 ft. and range, 700 miles.

The Model B17 R Beechcraft is powered with a Wright Whirlwind 420 hp. engine. General specifications: Number of seats, 4; horsepower, 420; gross weight, 3,600 lb.; useful load, 1,400 lb.; maximum speed, 202 m.p.h. at 9,000 ft.; and range 700 miles.

All single engined Beechcraft are of similar design and are distinguishable by the negative stagger of their biplane wing cellules. Retractable landing gears and flaps are included.

**Officers of the Beech company are listed in column 2.*

BEECH MODEL 18

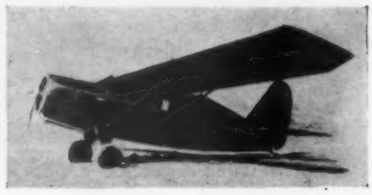
Beech Aircraft Company
Wichita, Kan.

SHORTLY before the close of 1935 word began to spread around the industry that Beech had gone bimotor and was developing an airplane to fit the feeder line specifications laid down by the Bureau of Air Commerce some time ago. Even now information on this ship is fragmentary but we know it is to be a 6-8 place low wing type powered with engines rated at about 275 hp. each.

The eight place seating arrangement is the one intended for airline use while the alternate six place plane is for executive flying. In the latter layout toilet facilities are provided at the rear of the cabin and the two passenger seats on the starboard side can be replaced by a couch.

Specifications have not been released but a cruising speed in the neighborhood of 185 m.p.h. and a single engine ceiling of 8,500 ft. are expected.

Officers of the company are: Walter H. Beech, president; R. K. Beech, vice-president; O. A. Beech, secretary-treasurer; T. A. Wells, chief engineer; William A. Ong, sales manager.



BELLANCA PACEMAKER

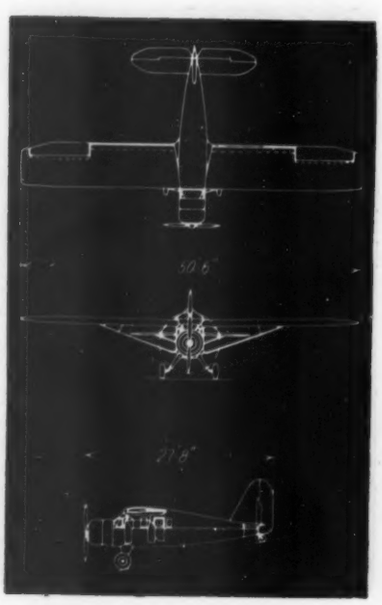
*Bellanca Aircraft Corporation**
Wilmington, Del.

WHEREVER heavy load carrying or long range flying is to be done, Bellanca airplanes are likely to turn up. They have been used extensively in record making and in transoceanic flights. The smallest of the Bellanca models, the Senior Pacemaker, is available as a transport plane and as a freighter. The transport version is equipped with six seats, while the freighter model may be arranged for two or eight seats, depending on whether or not cargo is to be carried. The engine is a Wright Whirlwind.

Latest editions of the Pacemaker models have been designed for improved appearance as well as efficient transport. Among the recent owners of these ships are General Airways, Ltd., of Toronto, Canada.

General specifications are: number of seats, 2 to 8; horsepower, 420; gross weight, 5,600 lb.; useful load (transport), 2,350 lb.; (freighter), 2,650 lb.; maximum speed, 160 m.p.h.; range, 860 to 1,100 miles.

**Officers of the Bellanca company will be found on page 24, column 2.*



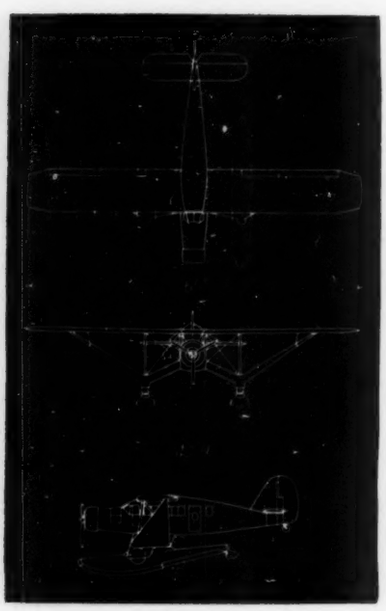
See also specification table on page 82

BELLANCA AIRCRUISER

Bellanca Aircraft Corporation
Wilmington, Del.

MORE THAN a decade ago G. M. Bellanca originated a design formula around a high wing monoplane type with external bracing by struts broad enough to add to the lift of the airplane as a whole. This idea has been used in both the Pacemaker and Skyrocket models, but it finds its extreme application in the Aircruiser in which the struts are broadened into the lower wing, producing in effect a sesquiplane. The Aircruiser is available either as a landplane or a seaplane and is powered with the Wright geared Cyclone. Its most spectacular application probably is the job it has to do for Mackenzie Air Service, Ltd., of Edmonton, Alberta, Canada, over a stretch of some 900-odd miles of uninhabited country between the railhead and the properties of the Eldorado Mining Company.

General specifications of the Cargo Aircruiser are: number of seats, 2 to 15; horsepower, 715 at 3,900 ft.; gross weight, 11,400 lb.; useful load, 5,285 lb.; maximum speed, 165 m.p.h. at 7,000 ft.; range, 610 to 1,000 miles.



BELLANCA SKYROCKET

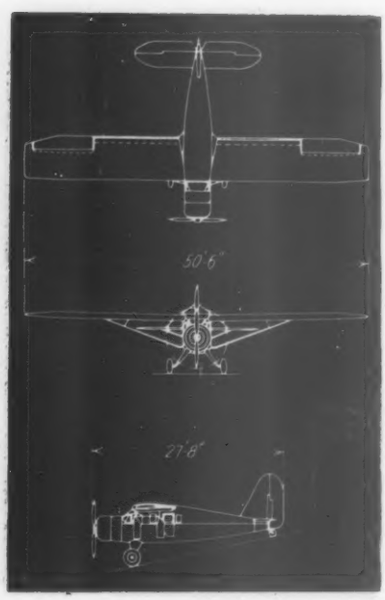
Bellanca Aircraft Corporation
Wilmington, Del.

A RECENT airplane trip around the world by Dr. Richard U. Light of New Haven, Conn., brought wide attention to the Bellanca Skyrocket model. The airplane used was No. 811 Wright Whirlwind powered de luxe Skyrocket.

The Senior model Skyrocket shown above is normally equipped with a Pratt and Whitney Wasp S3H1 engine rated at 550 hp. at 5,000 ft. It is generally similar to the Pacemaker models in its construction, design and appearance.

General specifications are: number of seats, 6; horsepower, 550 at 5,000 ft.; gross weight, 5,600 lb.; useful load, 2,160 lb.; maximum speed, 190 m.p.h. at 5,000 ft.; normal range, 600 to 1,000 miles.

Officers of the company include: G. M. Bellanca, president; N. S. Vanderlipp, first vice-president and general manager; Frank Bellanca, second vice-president; Andrew Bellanca, secretary; Willard R. Yarnall, treasurer; H. L. Thompson, sales manager; R. F. Wright, service manager.



BOEING 247-D

Boeing Aircraft Company,
Seattle, Wash.

ALTHOUGH the Boeing 247-D is best known as the standard passenger transport equipment on United Airlines, it has been used extensively in other transport operations and, to some degree, as a personal airplane for executive travel. The major difference between the Boeing 247-D and the predecessor, the Model 247, is found in the 247-D power plant. It consists of the geared supercharged S1H1-G Pratt & Whitney Wasp engines of 550 hp. swinging three-bladed controllable pitch propellers.

Specifications of the 247-D include: Number of seats, 12; horsespower, 1,100 at 8,000 ft.; gross weight, 13,650 lb.; useful load, 4,710 lb.; maximum speed, 200 m.p.h. at 8,000 ft.; range, 745 miles.

Officers of the Boeing Aircraft Company includes C. L. Egtvedt, president; Gardner W. Carr, vice-president (manufacturing); C. N. Monteith, vice-president and chief engineer; J. P. Murray, vice-president and Eastern representative; H. E. Bowman, secretary and treasurer.

See also specification table on page 82

BURNELLI UB-14

Burnelli Aircraft
Keyport, N. J.

THE FAMILIAR Burnelli design principle of constructing an airplane fuselage in the form of an airfoil section is characteristic of the latest UB-14 twin-engine transport. Major advantages claimed for this type of construction are the large cabin area per passenger and the accessibility of engines in flight. The UB-14-A model is a seaplane version of the UB-14, on Edo Model 37-15750 floats. Two Pratt & Whitney engines are used. The Burnelli UB-14 is of all-metal construction, using flat stressed skin aluminum alloy covering and extruded duralumin construction framework.

Specifications of the UB-14: Number of seats, 14; horsepower, 1,500 at 7,000 ft.; gross weight, 14,000 lb.: useful load, 6,000 lb.; high speed, 225 m.p.h. (6,000 ft.); range, 600 miles.

Officers of the Burnelli Aircraft, Ltd., include I. M. Uppercu, president; V. J. Burnelli, vice-president; H. Balenger, treasurer; F. W. Barker, secretary; I. M. Uppercu, sales manager; R. Contini, chief engineer, and H. R. Boyce, general manager.

CRUSADER AG-7

Crusader Aircraft Corporation
Denver, Col.

THIS year's crop of twin-engined designs has been exceptionally prolific. The Model AG-7, latest offering of Crusader Aircraft Corporation, differs from the others in that its tail is attached by outriggers to wing stubs integral with a sleek streamlined cabin having seats for seven persons, 38 cu.ft. of baggage space, and a nose mail compartment. The cabin is soundproofed and is equipped with heating and ventilating system. Rear seats are removable for cargo carrying. Landing gear is retractable, or fixed at the option of the purchaser. Wheel fairings are included.

Standard equipment includes night flying equipment and two-way radio. Automatic pilot and de-icing equipment are optional. Engines are C6S-4, six-cylinder Menascos with Eclipse starters and controllable pitch propellers.

Specifications are: number of seats, 7; horsepower, 500 at 5,000 ft.; gross weight, 6,000 lb.; useful load, 2,403 lb.; maximum speed (calculated), 210 m.p.h. at 5,000 ft.; range, 720 miles.

C-W COUPE 19-L

Curtiss-Wright Airplane Company
Robertson, Mo.

BUILT to meet the light plane specifications of the Bureau of Air Commerce, the Curtiss-Wright Coupe Model 19-L is the first all-metal aircraft to be produced at the Robertson, Mo., plant of Curtiss-Wright.

Throughout the development of the model, emphasis has been placed on low operating and maintenance costs as well as low landing speed and ease of control. The ship is available with the Lambert engine or the 145 hp. Warner Scarab.

The fuselage is of all-metal monococque type of relatively heavy gage, 24 ST. Alclad. The metal wing (of the same material) is built up around five spars and made in two panels bolted together and also bolted directly to the fuselage.

General specifications are: number of seats, 2; horsepower, 90 to 145; gross weight, 1,750 to 2,088 lb.; useful load, 608 to 728 lb.; maximum speed, 131 to 162; m.p.h. and range (Lambert), 496-1,150 miles.

**Officers of the company will be found on page 26, column 3.*

See also specification table on page 82

C-W CONDOR

Curtiss-Wright Airplane Company
Robertson, Mo.

FIRST transport airplane to be equipped as an air sleeper was the twin Cyclone, Curtiss-Wright Condor which has been in service for some time on several domestic operations, including American and Eastern. The Condor is arranged for eighteen passengers as a dayplane and twelve passengers at night. Its most notable application as a sleeper is on the Fort Worth-Los Angeles division of American Air Lines' transcontinental route.

When equipped as a sleeper, the cabin is divided into six compartments, each having two seats for day operation and upper and lower berths for night flights. The berth system is somewhat similar to that of a Pullman car, except that the lower berth is necessarily closer to the floor of the cabin.

General specifications are: number of seats, 18; horsepower, 1,430 at 7,000 ft.; gross weight, 17,500 lb.; useful load (dayplane), 6,035 lb., (sleeper), 5,265 lb.; maximum speed, 190 m.p.h. at 8,000 ft.; range, 650 miles.

C-W SPORT

Curtiss-Wright Airplane Company
Robertson, Mo.

POWERED with a 175 hp. Wright Whirlwind engine, the Curtiss-Wright Sport is the modern interpretation of the three-place open cockpit biplane so popular several years ago. The Sport is an unequal span single bay staggered biplane of conventional design and construction, having steel tube fuselage and wooden wings and tail surfaces with fabric covering. The usual seating arrangement for this type of ship is employed. Standard equipment includes compass, altimeter, air speed indicator, tachometer, oil pressure gage, oil temperature gage, gasoline gage, Hamilton standard adjustable propeller, navigation lights, radio bonding, dual controls, durable tail wheel and baggage compartment.

Like all other Curtiss-Wright commercial models, the Sport is built at the Middle Western plant.

General specifications are: number of seats, 3; horsepower, 175; gross weight, 2,150 lb.; useful load, 793 lb.; maximum speed, 135 m.p.h., and range about 350 miles.

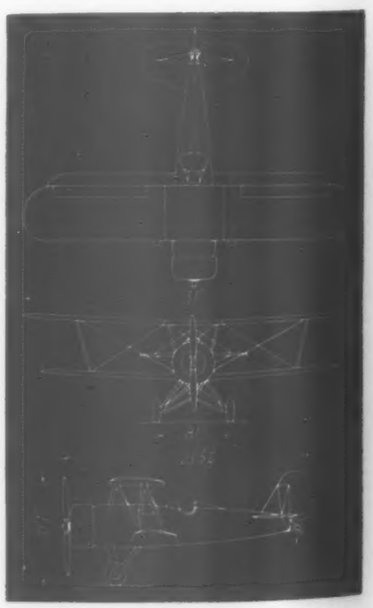
C-W SPEEDWING

Curtiss-Wright Airplane Company
Robertson, Mo.

THE DEMAND for an airplane of somewhat higher performance and slightly larger than the Sport has led to the manufacture of the Curtiss-Wright Speedwing A-14D, powered with the Wright Whirlwind engine series. The Speedwing is similar in general design and construction to the Sport, but is available in several variations. A two-place de luxe model is offered in addition to the standard three-place variety. The front cockpit can be closed in to increase performance when the ship is to be used as a single-seater, or for cargo carrying purposes. The ship may be used for training, cargo carrying, pleasure flying and a variety of purposes.

General specifications are: number of seats, 3; horsepower, 250-420; gross weight, 2,870-3,067 lb.; useful load, 957-1,098 lb.; maximum speed, 155-185 m.p.h.; range, 500-530 miles.

Officers of the company are: G. J. Brandewiede, vice-president and general manager; E. S. Cramer, secretary; G. M. Ebert, treasurer; and G. A. Page, chief engineer.



See also specification table on page 82

DOUGLAS DST, DC-3

*Douglas Aircraft Company**
Santa Monica, Cal.

WITH airline passenger traffic on the increase, a ship that can carry nearly twice as many passengers at only slightly higher operating cost than that of existing equipment is very likely to find a large market. Such an airplane is the new Douglas Transport which is available as a sleeper (Model DST) as a 24-passenger day plane (Model DC-3). The new Douglas looks very much like the DC-2, and is available with either the G series Wright Cyclone engine or Pratt & Whitney twin row Wasp of the SBG type.

Orders have been placed for these ships by American and United.

General specifications of the Douglas DST and DC-3 transports are: number of seats, 24, day plane (16 berths); horsepower, 1,600 to 1,700 at critical altitudes; gross weight, 24,000 lb.; useful load, 8,250 to 9,155 lb.; maximum speed at critical altitudes, 212 to 219 m.p.h.; range (maximum, 10,000 ft.) 2,020 to 2,150 miles.

**Officers of the Douglas Company will be found in column 2.*

DOUGLAS DC-2

Douglas Aircraft Company,
Santa Monica, Cal.

ONE of the transport planes that took an important part in showing operators the way to performance and profit is the Douglas DC-2. These ships are now in use on TWA, American Airlines, Pan American Airways, Eastern Air Lines, and a number of other operations in this country and abroad. More than 125 of them have been produced and the company still has orders for more.

The DC-2 is of all metal skin stressed construction with cantilever wing and retractable landing gear. It is available with either Wright Cyclone or Pratt & Whitney Hornet engines.

General specifications of the DC-2 are: number of seats, 16; horsepower, 1,420 (7,000 ft.); gross weight, 18,200 lb.; useful load, 6,200 lb.; maximum speed, 210 m.p.h. (8,100 ft.), and range, 1,225 miles.

Officers of the Douglas Company are: Donald Wills Douglas, president; Harry Wetzel, vice-president; Carl Cover, vice-president in charge of sales; Arthur Raymond, chief engineer; T. C. McMahon, secretary; and H. P. Grube, treasurer.

FAIRCHILD F-45

*Fairchild Aircraft Corporation**
Hagerstown, Md.

IT HAS BEEN a good many years since a low-wing landplane for commercial production and use has borne the name of Fairchild, but in the summer of 1935 a ship of this type, having all the internal appointments of a high priced automobile, made its appearance. Power plant is the Wright R760E2, 320 hp., seven-cylinder radial engine.

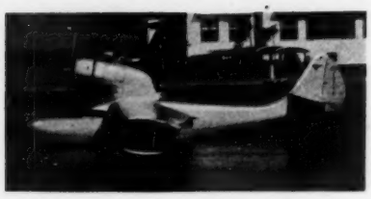
First of these ships to be built has been placed in executive service by the Superior Oil Company of Houston, Tex.

Equipment includes retractable landing gear and flaps of the split balanced type, extending across the trailing edge between ailerons. Adjustable trimming tabs also are provided in the design.

General specifications for the Fairchild F45 are: number of seats, 5; horsepower, 320 at sea level; gross weight, 4,000 lb.; useful load, 1,575 lb.; maximum speed, 171 m.p.h. at sea level; range 675 miles.

**Officers of the company are listed on page 28, column 3.*

See also specification table on page 82



FAIRCHILD AMPHIBIAN

Fairchild Aircraft Corporation
Hagerstown, Md.

MANAOS, Brazil, will soon be within four days of air travel from New York City, thanks to the Fairchild 91 "Baby Clipper," recently delivered to Pan American Airways for service on the 1,000-mile Amazon River run between Para and Manaos. Schedule time of this run will be reduced from 10 to 6½ hours by the use of the new Clipper. The power plant is a Pratt & Whitney Hornet rated at 750 hp.

A second clipper ship of this type powered with a 760 hp. Wright Cyclone is to be delivered to Pan American in the near future for use in scheduled service on the Yangtze River in China.

The Fairchild Amphibian is a high performance type having a useful load equivalent to about 40 per cent of its gross weight.

General specifications are: number of seats, 10; horsepower, 750 (2,500 ft.); gross weight, 9,700 lb.; useful load (passenger transport), 3,200 lb.; maximum speed (sea level), 173 m.p.h. (2,500 ft.); range, 660 miles.

FAIRCHILD 24

Fairchild Aircraft Corporation
Hagerstown, Md.

THE SMALLER open and closed Fairchild monoplanes have been used extensively in instruction, charter and other activities of flying service operators. The closed model, known familiarly as the Fairchild 24, comes equipped with either the Fairchild Ranger inverted in-line engine, or the Warner Super-Scarab radial. General dimensions and construction of these two models are similar and the speed of the ship with the inverted in-line engine is slightly higher than that of the radial for the same horsepower rating.

Among the well known pilot-owners of ships of this type are Grover Loening, Jimmy Taylor, Roger Wolfe Kahn, and J. Spencer Leech, airport and flying service operator at Armonk, N. Y.

General specifications are: number of seats, 3; horsepower, 145; gross weight, 2,400 lb.; useful load (Warner) 937 lb., (Ranger) 864 lb.; maximum speed (Warner) 135 m.p.h., (Ranger) 137 m.p.h.; range (Warner) 480 miles, (Ranger) 525 miles.

FAIRCHILD 22

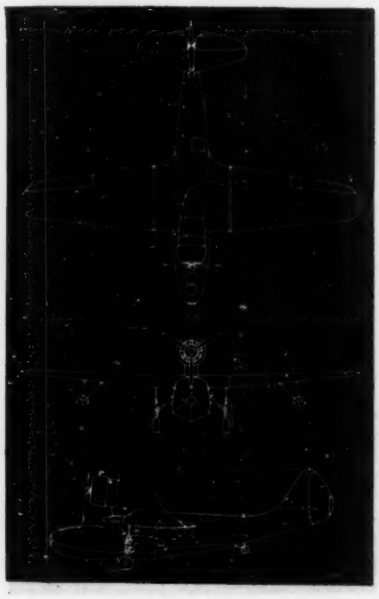
Fairchild Aircraft Corporation
Hagerstown, Md.

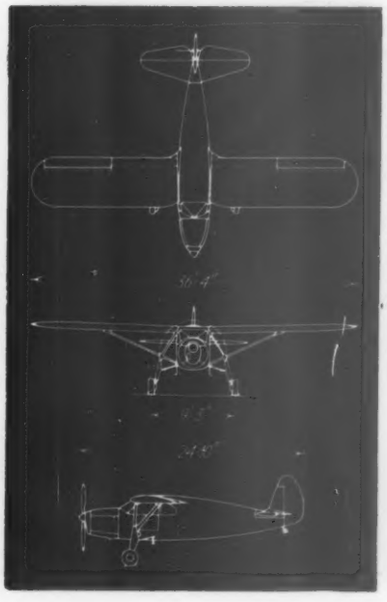
WHEN Luis de Florez, veteran private pilot, made his recent test on a new aural system of blind flying which he has been developing, he installed the apparatus in his Fairchild 22 and made a number of flights with James B. Taylor, Jr., as test or check pilot. Reports of these tests were discussed at the recent meetings of the Institute of the Aeronautical Sciences. Other owners of Fairchild 22s include Robert Love, Boston, fixed base operator, and Captain Harry Manning.

Wings, ailerons and tail surfaces of the 22 are similar in design to those used in the 24.

General specifications are: number of seats, 2; horsepower, 145; gross weight, 2,100 lb.; useful load, 816 lb.; maximum speed 135 m.p.h.; and range, 730 miles.

Officers of the Fairchild Aircraft Corporation are: Sherman M. Fairchild, president; L. E. Reisner, vice-president; W. H. Schwebel, vice-president; Leo Miller, secretary; W. J. Schwebel, treasurer; A. F. Flood, assistant secretary and treasurer.





See also specification table on page 82

KELLETT KD-1

Kellett Autogiro Corporation
Philadelphia, Pa.

THE KELLETT direct control wingless autogiro Model KD-1 has been substantially improved in detail and is now commercially available. Anticipating the possibilities of jump take-off, the mechanism that transmits the load from the engine to the rotor system for starting has been designed to withstand stresses considerably greater than those encountered in obtaining sufficient rotor speed for normal take-off. Mechanical details of the improvements to the Kellett machine were described in the December, 1935, issue of AVIATION, page 31.

The first of these ships is now at Langley Field for tests by the N.A.C.A.

General specifications are: number of seats, 2; horsepower, 225; gross weight, 2,075 lb.; useful load, 700 lb.; maximum speed, 125 m.p.h.; range, 361 miles.

Officers of the company are: W. Wallace Kellett, president; C. T. Ludington, vice-president; R. G. Kellett, treasurer; R. G. Kellett, secretary; W. R. Jones, chief engineer; R. H. Prewitt, executive engineer.

KINNER INVADER

*Kinner Airplane & Motor Corporation**
Glendale, Cal.

AMONG the designs that mark the fruition of the Air Commerce Bureau's feeder line plane specifications is the Invader, first twin engined ship to be offered by the Kinner Airplane & Motor Company, Ltd. A six-eight place cabin ship, the Invader has a conventional welded steel tube fuselage and a one-piece plywood covered cantilever wing. The cabin is soundproofed and equipped with a heater-ventilator system. A compartment for luggage in the rear is provided and a lavatory compartment is located at the rear of the cabin. Retractable landing gear has been designed so that in case of complete failure of the operating mechanism, it will lower by its own weight to a locked position. Moving the gear from one extreme position to the other shifts the c.g. only 0.3 inch.

Specifications for the standard six place model are: seats, 6; horsepower, 740 (5,000 ft.); gross weight, 8,500 lb.; useful load, 3,180 lb.; maximum speed, (5,000 ft.) 210 m.p.h.; range, 900-1,380 miles.

KINNER SPORTWING

*Kinner Airplane & Motor Corporation**
Glendale, Cal.

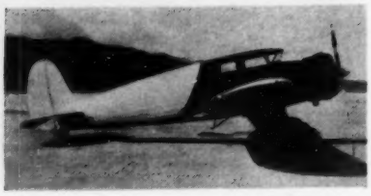
KINNER airplanes may be classified in three different groups as open and closed single-engine ships and the twin-engined Invader. Three open models are available—the K-Sportster, 100 hp. K-5 engine; the B-Sportster, with 125 hp. B-5 engine; and the B-2-R Sportwing with R-5 series 2 engine rated at 160 hp. The Sportwing (illustrated above) is of conventional construction and design, having a steel tube fuselage, wooden wing structure and fabric covering.

Standard equipment includes adjustable seat, shatterproof glass windshield, fabrikoid upholstering, battery, wing root and fairing. Extra equipment; radio flares, steel propeller, cockpit enclosure, adjustable landing lights, etc. The Sportwing is also available with 125 hp. Kinner engine.

General specifications are: number of seats, 2; horsepower, 160; gross weight, 2,170 lb.; useful load, 773 lb.; maximum speed, 132 m.p.h.; range, 510 miles.

**Officers of the Kinner corporation will be found on page 30, column 2.*

See also specification table on page 82



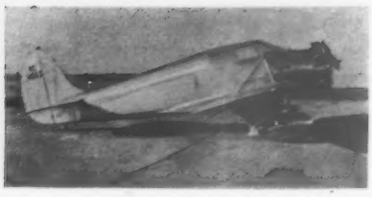
KINNER ENVOY

Kinner Airplane & Motor Corporation
Glendale, Cal.

OF the two low-wing cabin monoplanes offered by the Kinner company, the Envoy is the larger. It is a four-place machine powered by the Kinner SC-7 engine, rated 370 hp. at 5,000 ft. Highest in performance of the Kinner single engined models, the Envoy has a 700-mile cruising range, an unusually high figure for airplanes in the same class. Elevator trimming tabs replace the usual adjustable stabilizer and wing flaps are provided to reduce landing speed. In addition to the usual items of equipment, a radio receiving set is included as standard. A controllable pitch propeller may be fitted as optional equipment.

One of the first of the Envoys to be built was purchased for the Bureau of Aeronautics of the Navy Department, for high-speed executive and transport service.

General specifications are: number of seats, 4; horsepower, 370 at 5,000 ft.; gross weight, 4,300 lb.; useful load, 1,450 lb.; maximum speed, 185 m.p.h. (5,000 ft.); range, 700 miles.



KINNER PLAYBOY

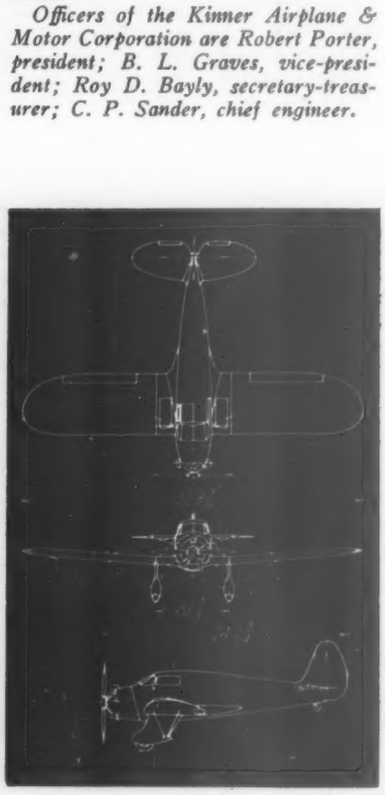
Kinner Airplane & Motor Corporation
Glendale, Cal.

THE smaller of the closed single-engine ships offered by Kinner is the Model R Playboy with Kinner Series R-5 Kinner engine. The Playboy has side-by-side seating and is of conventional construction. The fuselage is a rectangular structure of welded steel tubing, faired to an oval section and covered with fabric. Wing stubs are integral with the fuselage and panels are of wood construction. Tail structure is of welded steel tubing. Like all the other Kinner models it is fitted with tab controls on the elevators for longitudinal trim.

The Playboy is suitable for pleasure flying, instruction, and a number of fixed base applications.

General specifications are: number of seats, 2; horsepower, 160; gross weight, 2,270 lb.; useful load, 789 lb.; maximum speed, 140 m.p.h.; range 580 miles.

Officers of the Kinner Airplane & Motor Corporation are Robert Porter, president; B. L. Graves, vice-president; Roy D. Bayly, secretary-treasurer; C. P. Sander, chief engineer.



MONOCOUPE MODEL 90

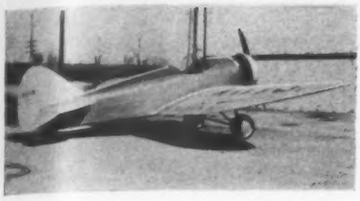
*Lambert Aircraft Corporation**
Robertson, Mo.

ALTHOUGH the Lambert Aircraft Corporation is expanding its line of ships to include various low wing designs, it is still maintaining active production of the familiar Monocoupe Model 90 and de luxe 90A. The high wing Monocoupes have been popular for several years in the field of fast cabin two-seaters. The power plant is normally the Lambert R-266 radial engine rated at 90 hp. at sea level. Wheel pants and full N.A.C.A. cowling are included in the standard equipment. Optional equipment includes cabin heater, starter, storage battery, landing lights, radio, radio Syncronode, and flares. Space is provided on the instrument board for the usual instruments necessary for blind flying. The stabilizer is fixed and longitudinal trim is obtained by a small tab.

General specifications are: number of seats, 2; horsepower, 90; gross weight, 1,610 lb.; useful load, 643 lb.; maximum speed, 130 m.p.h.; range, 600 miles.

**Officers of the company are listed page 31, column 1.*

See also specification table on page 88



MONOPREP, MONOSPORT

Lambert Aircraft Corporation
Lambert Field, Robertson, Mo.

WHEN A. W. Mooney became chief engineer of the Lambert Aircraft Corporation, it was only natural to expect that something would be done about the high wing tradition of Monocoupe by the man who had been a pioneer designer of low wing monoplanes in Wichita, Kan. The only question was whether the company would continue to make high wing planes after the inevitable low wing models were introduced. The answer is that Lambert is going to offer both the familiar Monocoupe 90 and a brand new low wing Monoprep and Monosport, both two-place open-closed low wing monoplanes.

General specifications of the new series of ships are: number of seats, 2; horsepower, 90; gross weight, 1,550 lb.; useful load, 595 lb.; maximum speed (Monoprep), 120 m.p.h., (Monosport) 130 m.p.h.; range, 590 miles.

Officers of the company are C. W. Bunch, president; J. V. Reynolds, vice-president; E. N. Freel, treasurer; C. W. Bunch, sales manager; and A. W. Mooney, chief engineer.

LOCKHEED 12

*Lockheed Aircraft Corporation**
Burbank, Cal.

THE BEGINNING of 1936 brought with it several new designs to fit the Department of Commerce feeder line equipment specifications and one of these was the Model 12-A Lockheed, a smaller edition of the Electra. Four variations are to be available. Model 12-A will be powered by two Pratt & Whitney Wasp Jr. SB engines, having 450 hp. available for take-off, 300 hp. for cruising. Wright Whirlwind engines, Model R975ER, will be used for Model 12-B developing 440 hp. for take-off, 300 hp. for cruising. In the lower horsepower ratings, the seven-cylinder Wright Whirlwind engine will be used in Model 12-F. In-line engines are intended for Model 12-M, to be powered with two six-cylinder Menascos.

Specifications for the Model 12-A are: number of seats, 8; horsepower, 600 (cruising); gross weight, 7,925 lb.; useful load, 2,570 lb.; maximum speed 226 m.p.h. at 5,000 ft.; range 565 miles.

**Officers of the company will be listed on page 32, column 2.*

LOCKHEED ELECTRA

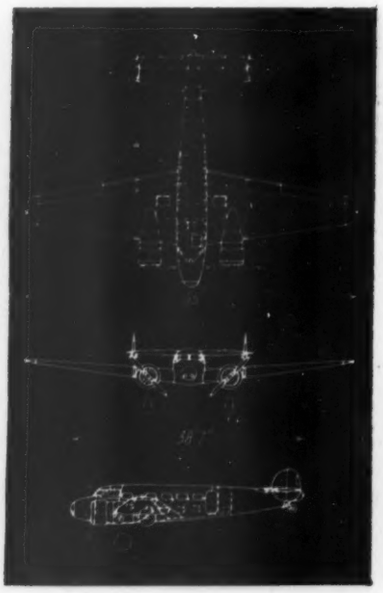
*Lockheed Aircraft Corporation**
Burbank, Cal.

EQUIPMENT modernization programs of the scheduled airline operators, created a demand for a large number of Lockheed Electras in 1935. And among those who added them to their fleets were Eastern, Delta, Northwest, Pan American and a number of others.

The principal transport application of the Electra is to the local services of the major airlines where frequent stops must be made, but a high performance all-metal ship, having a low operating cost is required.

Lockheed Electras are available with either Pratt & Whitney Wasp or Wright Whirlwind engines. Model 10-A uses the Wasp Jr. with 450 hp. at 2,300 ft., Model 10-E a Wasp Sr. at 550 hp. at 2,200 r.p.m. The Model 10-B is powered with Wright Whirlwind engine rated 440 hp.

General specifications are: number of seats, 12; horsepower, 900-1,100; gross weight, 10,000 to 10,500 lb.; useful load, 3,400 to 3,775 lb.; maximum speed, 200 to 215 m.p.h. and range 800 to 830 miles.



See also specification table on page 82

ORION, ALTAIR

Lockheed Aircraft Corporation
Burbank, Cal.

BEFORE the Lockheed Corporation went into the production of metal aircraft, the low-wing Orion was manufactured extensively for high speed transport service. The Orion and the closely related Altair continue to be available among the single engined offerings of the Lockheed Company. They have been used extensively in this country and abroad in a number of airline operations.

Powered by the Pratt & Whitney S1-D1 Wasp (550 hp. at 5,000 ft.) the Orion is of wooden monococque construction and has accommodations for six passengers.

Both the Orion and Altair are equipped with combination cable and hydraulically operated retractable landing gears. Fairings cover the wheel wells when the gear is in retracted position.

General specifications are: number of seats, 2-6; horsepower, 550 at 5,000 ft.; gross weight, 5,800 lb.; useful load, 2,160-2,250 lb.; maximum speed, 220-225 m.p.h. (5,000 ft.) and range, 750-1,150 miles.

VEGA MODEL 5C

Lockheed Aircraft Corporation
Burbank, Cal.

VETERAN of many famous flights is the Lockheed Vega, Model 5-C whose origin dates back to the early efforts of Allen and Malcolm Loughead when their plant was located at Hollywood. The Vega is a high-wing monoplane of wooden construction with monococque fuselage powered by the 450 hp. (6,000 ft.) Pratt & Whitney Wasp S3B1 engine. The Vega has been used extensively as an executive ship and in a variety of internal arrangements. One of the most famous Vegas is the Winnie Mae flown by the late Wiley Post.

General specifications are: number of seats, 7; horsepower, 450 at 6,000 ft.; gross weight, 4,750 lb.; useful load, 1,900 lb.; maximum speed, 190 m.p.h. at 6,000 ft.; normal range, 660 miles.

Officers of the Lockheed Aircraft Corporation are: Robert E. Gross, president and treasurer; Carl B. Squier, vice-president and sales manager; Cyril Chappellet, secretary; Hall L. Hibbard, chief engineer, and Richard von Hake, factory superintendent.

LUSCOMBE PHANTOM

Luscombe Airplane Development Corporation, West Trenton, N. J.

WHEN the executive experience of D. A. Luscombe was merged with the design ability of Ivan H. Driggs, the result was the Luscombe Phantom, a high performance, two-place all-metal ship intended frankly as a quality product and conceived without the consideration of price. The first of these ships, built at Kansas City, Mo., and powered with the 125 hp. Warner Super-Scarab engine, sold for about $6,000. Recent efforts of the company have been directed towards increased production and decreased costs. Other power plants with outputs as low as 90 hp. can be used in the Phantom.

The company is now getting into production at its new location at Mercer airport where a factory and mechanics school is being operated.

General specifications are: number of seats, 2; horsepower 145; gross weight, 1,950 lb.; useful load, 630 lb.; maximum speed 163 m.p.h.; range 560 miles.

Officers of the company are: D. A. Luscombe, president; Ivan H. Driggs, chief engineer.

See also specification table on page 82

MARTIN 130

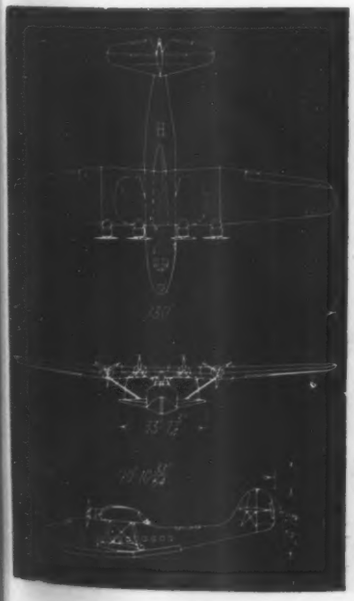
The Glenn L. Martin Company
Baltimore, Md.

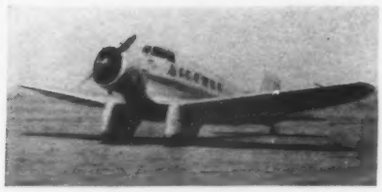
DESIGNED in cooperation with Pan American Airways for the exacting requirements of its Transpacific Service, the Martin 130 Ocean Transport is the largest flying boat that has been built in America. Size has been no handicap to performance of this design which has a necessarily remarkable combination of speed and range.

Two of the three ships ordered by Pan American are now in regular service between San Francisco and Manila over the rectnly established airway across the Pacific.

General specifications of the Model 130 Ocean Transport are: number of seats, 52; (or 22 berths); horsepower, 3,320 (6,000 ft.); gross weight, 51,000 lb.; useful load, 26,389 lb.; maximum speed, 180 m.p.h. at 8,000 ft. and range, 3,200 miles.

Officers of the Glenn L. Martin Company are: Glenn L. Martin, president; Lessiter C. Milburn, vice-president; M. G. Shook, treasurer; T. J. Jones, secretary; J. T. Hartson, sales manager; and B. C. Boulton, chief engineer.





NORTHROP DELTA

*The Northrop Corporation**
Inglewood, Cal.

WHERE PASSENGER, mail or executive transportation requires high speed single-engined equipment, one is likely to find Northrop airplanes. All models employ the characteristic multicellular construction and are equipped with split wing flaps.

The Delta is available in several forms. As a transport plane it can be fitted as a single pilot ship for eight passengers or a two-pilot ship for six passengers. In both of these models, the pilot's compartment is forward. When equipped as a mail plane, the pilot's compartment is at the rear, and a cargo capacity of 175 cu.ft. is provided forward. This model is available for either single control or tandem dual control. The two-pilot version has 155 cu.ft. of cargo space.

General specifications are: number of seats, 1 to 9; horsepower, 710 (7,000 ft.); gross weight, 7,350 lb.; useful load, 2,750 lb.; maximum speed, 221 m.p.h. (17,000 ft.); range, 1,650 miles.

**Officers of the company are listed in column 3.*

NORTHROP GAMMA

The Northrop Corporation
Inglewood, Cal.

THE SPECTACULAR performance of the Northrop Gamma has attracted much attention recently. A short time ago a new transcontinental record was established by one of these ships by Howard Hughes when he flew from Los Angeles to New York in 9 hours and 27 minutes.

The Gamma is a single pilot ship with a 110 cu.ft. compartment forward that can be used for cargo or specialized accommodations. Normal power plant is the Wright Cyclone SR1820-F53 rated 750 hp. at 11,000 ft.

General specifications are: number of seats, 1 or 2; horsepower, 750 (11,000 ft.); gross weight, 7,350 lb.; useful load, 3,250 lb.; maximum speed, 228 m.p.h. at 11,000 ft.; range, 1,760 miles (normal), 2,130 miles maximum.

Officers of the Northrop Corporations are: John K. Northrop, president; W. K. Jay, vice-president and treasurer; T. C. McMahon, secretary; W. K. Jay, sales manager; John K. Northrop, chief engineer; Donald Douglass, H. H. Wetzel, W. L. Stewart, directors.

See also specification table on page 82

PITCAIRN XOP-2

Pitcairn Autogiro Company
Willow Grove, Pa.

ALTHOUGH the Army and the Navy both have purchased new direct-control autogiros from Pitcairn Autogiro Company, the same general type of craft with minor modifications is to be available commercially.

The latest and largest of the autogiros is of conventional construction and will be equipped with the jump take-off feature as soon as it is ready for commercial use. A Wright Whirlwind engine is used in the Army ship. The new "roadable autogiro," under development by the Autogiro Company of America has been designed so that it can be driven on the highways. It is described on page 98.

Specifications for the Pitcairn Army autogiro are: number of seats, 2; horsepower, 420; gross weight, 3,330 lb.; useful load, 960 lb.; maximum speed, 150 m.p.h.

Officers of Pitcairn Company are Harold F. Pitcairn, president and treasurer; Raymond Pitcairn, vice-president; James G. Ray, vice-president; K. C. Acton, secretary; Agnew Larsen, chief engineer.

PORTERFIELD 35, 35-70

Porterfield Aircraft Corporation
Kansas City, Mo.

AMONG the light two-place ships priced below $2,000 is the Porterfield which sells at $1,895 and is available with either the LeBlond 5D 65 hp. engine or the LeBlond 5DE 70 hp. unit. The Porterfield is unusual in that the cabin seats are arranged in tandem. Large windows and a transparent panel in the wing provide good vision for the occupants of both seats. The ship has a baggage weight allowance of 30 lb. Equipment includes Goodyear Air Wheels with or without brakes.

Porterfield ships have been used extensively in fixed base operations.

General specifications (35-70): number of seats 2; horsepower 70; gross weight 1,103 lb.; useful load 297 lb.; maximum speed 115 m.p.h. at 700 ft.; range 350 miles.

Officers of the company are: E. E. Porterfield, Jr., president and general manager; Mrs. E. E. Porterfield, Jr., vice-president; N. R. Hockaday, secretary; Edgar F. Smith, Jr., sales manager; H. W. Barlow, chief engineer.

REARWIN 7000, 8500

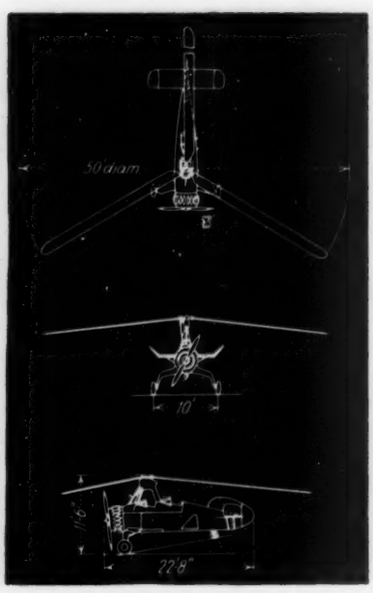
*Rearwin Airplanes, Incorporated**
Kansas City, Mo.

THE PRESENT Rearwin line consists of four models, three of which are two-place, cabin monoplanes, and the fourth a three-place open biplane. The Models 7000 and 8500 are identical in dimensions, areas and gross weights and differ mainly in power plants and performance, The 7000 is powered with the LeBlond 5GE rated at 70 hp. and the Model 8500 is powered by the LeBlond 5GF rated 85 hp. and sells for $2,370 as compared with $2,095 for the lower powered model. There is about 3 m.p.h. difference in high speed performance between these two models.

Both of these ships have conventional wood and fabric construction, have oleo spring shock absorbers for the landing gear and are supplied with either tailskid or tail wheels.

General specifications are: number of seats, 2; horsepower, 70 to 85; gross weight, 1,410 lb.; useful load, 557 to 580 lb.; high speed, 115 to 118 m.p.h. at 800 ft. and range 475 miles.

**Officers of the company will be found on page 35, column 1.*



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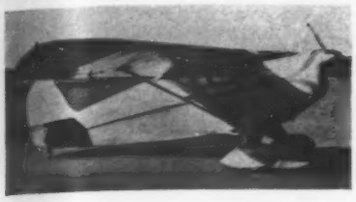


REARWIN 6000

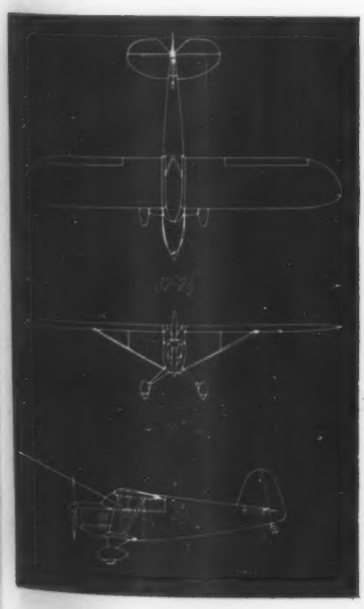
Rearwin Airplanes
Kansas City, Mo.

HIGHER in price and performance than the model 7000 and 8500 is the Rearwin 6000, powered with an American Cirrus engine. Although similar to the others in design and construction, the Model 6000 is slightly smaller and heavier than the other closed Rearwin models. The Rearwin 6000 is known familiarly as the "Speedster," while the radial engined ships are called "Sportsters."

The three-place open biplane model made by Rearwin is the No. 2000-C powered with 185 hp. Curtiss Challenger engine and having a high speed of 140 m.p.h. at 8,000 ft.

General specifications of the Model 6000 are: number of seats 2; horsepower 95; gross weight 1,605 lb.; useful load 613 lb.; maximum speed, 144 m.p.h. at 800 ft. and range 680 miles.

Officers of the company are: R. A. Rearwin, president; Albert R. Jones, vice-president; Kenneth R. Rearwin, sales manager and treasurer; Royce F. Rearwin, secretary; William Henry Weeks, chief engineer.



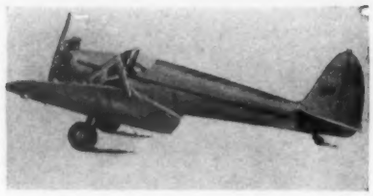
RYAN ST

Ryan Aeronautical Company
San Diego, Cal.

AN unusual combination of all-metal monocoque fuselage, wood and fabric wings is found in the most recent product of the Ryan Aeronautical Corporation—the Ryan ST. The ST is a two-place tandem, low-wing monoplane of clean design, powered with the 95-hp. Menasco engine. A racing type of landing gear with long travel oleo shock absorbers and Goodyear airwheels and brakes are used. Wing flaps and elevator trimming tabs are embodied in the design. The Ryan ST has found extensive application as a ship for private owners and fixed base operators because of its high performance for low power.

General specifications of the ST are: number of seats, 2; horsepower, 95; gross weight, 1,570 lb.; useful load, 543 lb.; maximum speed, 140 m.p.h., and range, 400 miles.

Officers of the company are: T. Claude Ryan, president; Earl D. Prudden, vice-president and sales manager; E. A. Smith, secretary-treasurer; Millard C. Boyd, chief engineer; E. G. Nabell, superintendent.



SECURITY NATIONAL S1-A

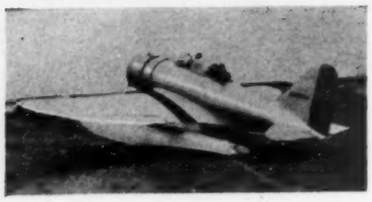
Security National Aircraft Corporation
Los Angeles, Cal.

WHEN W. B. Kinner, veteran California manufacturer of airplanes and engines, decided to concentrate on the production of airplanes, his product was the Security National S1-A, two-place sportster with a Security S-5 engine,—a 120 hp. radial. The Security S1-A is a low-wing monoplane selling for $2,495 and is available with landing gear or on floats. Standard equipment includes Pioneer altimeter, airspeed indicator, compass, tachometer, oil pressure gage, oil temperature gage, Zenith ammeter and Security fuel gage. The Airster has folding wings.

General specifications are: number of seats, 2; horsepower, 125; gross weight, 1,775 lb.; useful load, 625 lb.; maximum speed, 125 m.p.h. at sea level, and range, 300 miles.

Officers of the Security National Aircraft Corporation are: W. B. Kinner, president; Winfield B. Kinner, Jr., vice-president; Hugh H. Green, treasurer and sales manager; H. Park Arnold, secretary; and Max B. Harlow, chief engineer.

See also specification table on page 82



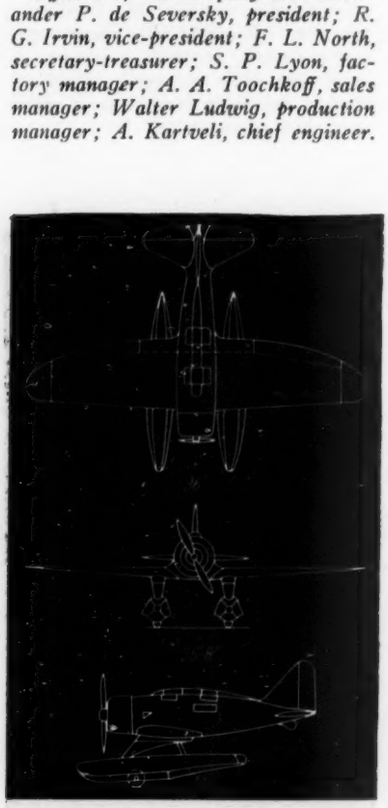
SEVERSKY SEV-3M

Seversky Manufacturing Company
Farmingdale, L. I., N. Y.

NOTABLE feature of the Seversky SEV-3M high performance amphibian, is the unusual type of landing gear with semi-retractable floats on landing wheels projecting through openings in the V-bottoms of the float. The design of the SEV-3M all-metal low-wing monoplane forms the basis of a number of military models including a basic trainer for the army, a number of which are now in service, and a two-place pursuit ship. The commercial amphibian has a number of applications where high speed land and water service is the principal requirement.

General specifications are: number of seats 2 to 3; horsepower 420; gross weight 4,200 lb.; useful load, 2,545 lb.; maximum speed 185 m.p.h. (2,200 ft.) and range 1,000 miles.

Officers of the company are: Alexander P. de Seversky, president; R. G. Irvin, vice-president; F. L. North, secretary-treasurer; S. P. Lyon, factory manager; A. A. Toochkoff, sales manager; Walter Ludwig, production manager; A. Kartveli, chief engineer.



SIKORSKY S-43

Sikorsky-United Aircraft Manufacturing Corporation, Bridgeport, Conn.*

PRODUCTION facilities at the Sikorsky plant are devoted largely at the present time to the manufacture of the S-43 amphibian,—a model somewhat smaller but structurally similar to the S-42 "Pan American Clipper" which took such an important part in the survey work on the Pacific Air Route. The S-43 is being used by Inter-Island Airways in Hawaii and has been selected as equipment on the proposed over-water service between New York and Boston. It should find a number of similar applications.

The S-43 is available with or without landing gear. Regular landing gear equipment includes the Sikorsky retractable hydraulic type with Autofan wheels and Sikorsky brakes. The engines are Pratt & Whitney geared Hornets.

General specifications are: number of seats, 18; horsepower 1,500 at 7,000 ft.; gross weight, 19,000 lb.; useful load, 6,430 lb.; maximum speed 194 m.p.h. at 7,000 ft.; range 800 miles.

**Officers of the company will be found in column 3.*

SIKORSKY S-42-A

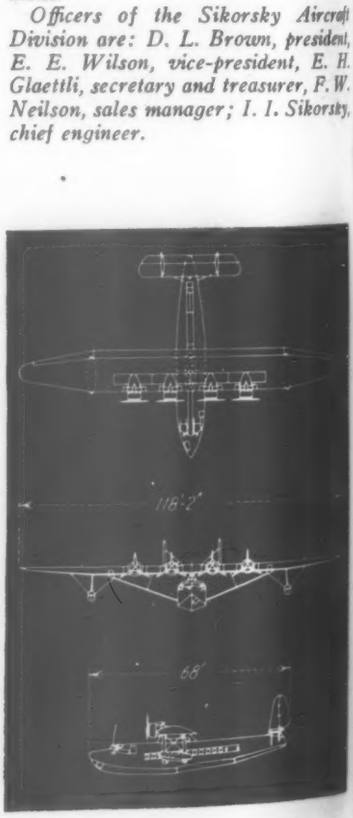
Sikorsky-United Aircraft Mfg. Corp., Bridgeport, Conn.

THE SIKORSKY S-42-A "Pan American Clipper" will long be remembered as the trail blazer of the present Trans-Pacific air route. Equipped as a flying meteorological laboratory, the ship made a series of survey flights stopping at the ocean bases established by Pan American. Sister ships are operating daily in the South American services of Pan American.

The S-42-A is powered with four Pratt & Whitney geared Hornet engines (SIEG model) and has cabin accommodation for 32 day passengers or fourteen night passengers and a crew of five.

General specifications are: number of seats, 37; horsepower 3,000 at 7,000 ft.; gross weight 40,000 lb., useful load 16,800 lb.; maximum speed 190 m.p.h. at 7,000 ft.; range 1,200 miles.

Officers of the Sikorsky Aircraft Division are: D. L. Brown, president, E. E. Wilson, vice-president, E. H. Glaettli, secretary and treasurer, F. W. Neilson, sales manager; I. I. Sikorsky, chief engineer.



See also specification table on page 82

STEARMAN 73

Stearman Aircraft Company
Wichita, Kan.

THE Stearman 73-B1 is one of three general models offered by the Stearman Aircraft Company. Two of these ships, the 73 and 75, are two-place trainers. The 73 is powered with 235 hp. Wright Whirlwind while the 75 mounts the Lycoming 215 hp. engine. The third member of the group, the Model 76, is a two-place expeditionary airplane available with either the Wright or Wasp Jr. engine of 420 hp. In general dimensions and construction these three ships are similar. All three are built with welded steel tube fuselages and wooden wings with fabric covering.

General specifications are: number of seats, 2; horsepower, 235 to 420; gross weight, 2,626 lb, to 3,310 lb.; useful load, 618 lb. to 1,206 lb.; maximum speed, 125 to 165 m.p.h.; range, 379 to 412 miles.

Officers of the Stearman Aircraft Company are: J. E. Schaefer, president; Mac Short and J. P. Murray, vice-presidents; Clif Barron, secretary-treasurer; and Mac Short, chief engineer.

STINSON RELIANT

*Stinson Aircraft Corporation**
Wayne, Mich.

COINCIDENTAL with Stinson's tenth anniversary comes a new series of Reliant models that have gone gull-wing and are featured by vacuum flaps, full cantilever landing gear, and a number of detailed refinements in design.

The SR-7 series consists of two models, fundamentally similar, but differing mainly in equipment. Substitution of a controllable pitch propeller and larger gasoline tanks together with special interior appointments, constitute the major differences in the Model B as compared with the Model A of the series. There is a considerable saving to the purchaser who buys the equipped Model B rather than separate equipment for a Model A ship.

General specifications are: number of seats, 4; horsepower, 225 to 245; gross weight, 3,375 to 3,600 lb.; useful load, 1,115 to 1,290 lb.; cruising speed, 138.5 to 141 m.p.h. at 5,000 ft.; range, 400 to 560 miles.

**Officers of the company are listed on page 38, column 1.*

STINSON MODEL B

*Stinson Aircraft Company**
Wayne, Mich.

WITH the requirements of the feeder line operator foremost in mind, the Stinson Company has recently introduced the Model B six-passenger, twin-engine airplane. Externally the Model B is somewhat similar in appearance and general arrangement to the Model A Trimotor. Structural details also follow Model A practice. Simplicity of design and the elimination of complicated parts have done much to reduce the expense of maintenance.

The feeder line operator's problem of getting in and out of small fields has been kept in mind in the design and wing loading is below the average for transport planes. Slower landings, more rapid take-offs, and improved performance on one engine have been the result. Retractable landing gear has been designed for minimum damage in "whee's up" landings.

General specifications of the Model B are: number of seats, 6; horsepower, 520; gross weight, 6,600 lb.; useful load, 2,100 lb.; cruising speed, 160 m.p.h. at 6,000 ft.; range, 900 miles.

See also specification table on page 82.

STINSON MODEL A

Stinson Aircraft Company
Wayne, Mich.

THE ONLY modern tri-motor transport in airline service at the present time is the Stinson A powered with three Lycoming engines. The Model A has a steel tube fuselage and wing structure with spars built up of welded chrome molybdenum steel tubing and ribs of riveted square dural tubing. Fabric covering is used for both wing and fuselage. Landing gear is retractable by electric power. Trailing edge flaps extend across the center section between nacelles and ailerons run almost the full length of the wing panels.

General specifications are: number of seats, 10; horsepower, 780; gross weight 10,200 lb.; useful load, 3,000 lb.; maximum speed, 180 m.p.h.; range, 640 miles.

Officers of the company are: B. D. DeWeese, president; W. A. Mara, vice-president; O. R. Stocke, treasurer; R. S. Pruitt, secretary; J. C. Keeley, Jr., sales manager; R. W. Ayer (Transport), chief engineer; C. R. Irvine (Reliant), chief engineer; E. H. Huff, factory superintendent and service manager.

TAYLOR CUB

Taylor Aircraft Company
Bradford, Pa.

THREE TIMES as many Taylor Cubs were sold in 1935 as in the previous year and the company has set about to improve a number of design details in the 1936 model. Although the basic design remains unchanged, the suggestions of over a hundred operators of Cubs were considered by the engineering department and the result has been a much cleaner airplane whose aerodynamic efficiency is reflected in increased performance. Landing gear tread has been increased to 72 in., also as a result of the suggestions of Cub operators and pilots. The new model is also available with winter enclosure.

General specifications of the new Taylor Cub are: number of seats, 2; horsepower, 37; gross weight, 970 lb.; useful load, 407 lb.; maximum speed, 87 m.p.h.; range, 210 miles.

Officers of the Taylor Aircraft Company are T. V. Weld, president and sales manager; Walter Jarnouneau, vice-president and chief engineer; W. T. Piper, treasurer; William T. Piper, secretary.

WACO C-6

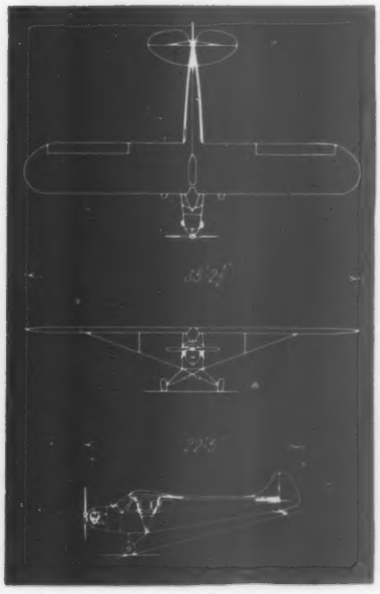
*Waco Aircraft Company**
Troy, Ohio

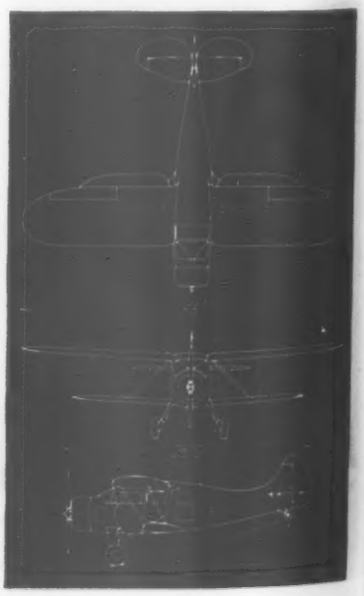
WACO AIRPLANES for 1936 are available in four series of models, two open and two closed. The larger of the cabin ships are those of the C-6 series which are available in five power plant variations—Continental, two Jacobs and two Wrights, ranging in price from $7,295 to $9,650. Structural characteristics and overall dimensions for these five models are identical. All come equipped regularly with Auto Fan wheels and brakes and Goodyear tail wheels. Baggage allowance of 125 lb. is made in each model. Plans are under way to license these ships for seaplane float equipment.

Ships of this new series have longer fuselages, giving greater leg room, an improved instrument board, and flaps to replace the older rotatable struts.

General specifications are: number of seats, 5; horsepower, 225 to 320; gross weight, 3,350 to 3,500 lb.; useful load, 1,300 to 1,450 lb.; maximum speed, 155 to 173 m.p.h. and range, 550 to 650 miles.

**Officers of the company will be found on page 39, column 3.*





See also specification table on page 82

WACO S-6

Waco Aircraft Company
Troy, Ohio

LOWER in power and in price than the C-6 series of cabin planes is the closed S-6 model powered with the Jacobs L-4 engine. Like other Jacobs engines the L-4 is available with either magneto or battery ignition. Automobile practices have been followed closely in engine control installation and interior appointments. The S-6 model is similar in construction to the higher priced cabin ship, but has slightly smaller overall dimensions. The price is under $5,000.

Fuselage is of the usual welded steel tube construction, wings are of wood, and both are covered with fabric. Like the C-6 models it has a baggage space allotment of 125 lb. Landing gear equipment is similar to that of the C-6 series using Auto Fan wheels and brakes and a Goodyear tail wheel. The Model S-6 is also available on Edo floats.

General specifications are: number of seats, 5; horsepower, 225; gross weight, 3,250 lb.; useful, 1,452 lb.; maximum speed, 144 m.p.h.; range, 450 miles.

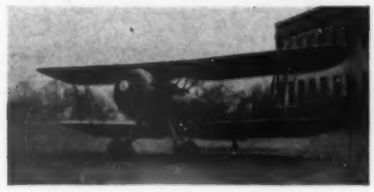
WACO D-6

Waco Aircraft Company
Troy, Ohio

AN OPEN biplane having higher power and performance than the members of the F-6 series is also available in the Waco line. This ship, one of the members of the D-6 series is powered with a Pratt & Whitney engine of 400 hp. and is slightly larger in overall dimensions than the F-6 models. The S3-HD is a tandem two-seater with cockpit enclosure. Although it is structurally similar to all of the Waco machines it departs considerably from standard Waco design.

The top wing consists of but two panels joined at a shallow cabane above the fuselage. Pilot and passenger sit further aft and the turtle deck runs up to the rear of a "coupe" cockpit shelter and the entire fuselage is carefully faired for aerodynamic efficiency. There has been a considerable demand for this model in the export market. A military version is also available.

General specifications are: number of seats, 2; horsepower, 400; gross weight, 3,400 lb.; useful load, 1,100 lb.; maximum speed, 195 m.p.h.; range, 650 miles.



WACO F-6

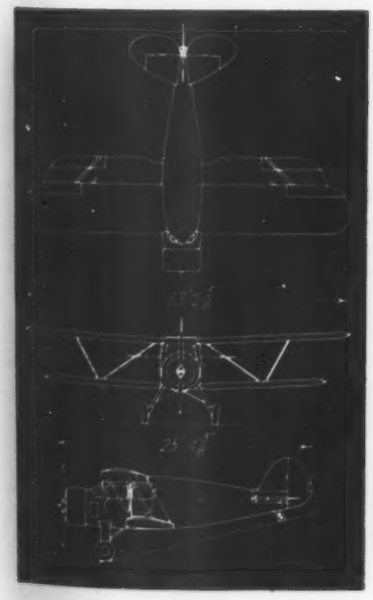
Waco Aircraft Company
Troy, Ohio

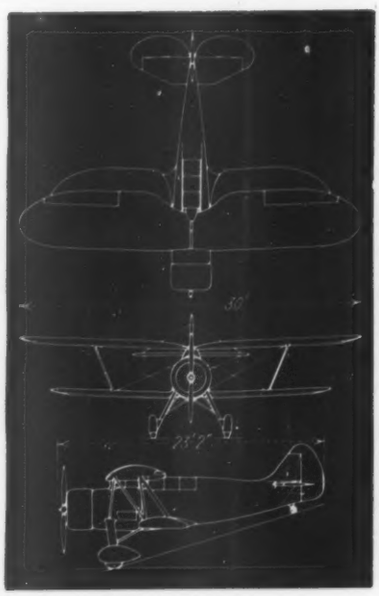
ALL WACO open models this year are supplied with winter enclosures. In the F-6 series the airplanes are identical in dimensions with four power plant variations—Continental, two Jacobs and a Wright.

Structurally the F-6 series follow standard Waco practice using steel tube fuselage, wood wings and fabric covering. Landing gear equipment is of the same make as that of the cabin models,—Auto Fan wheels and brakes and Goodyear tail wheels. A 75 lb. baggage allowance is standard for all models of this series. Two of the open models, the Continental and Jacobs L-4, are to be available with floats.

General specifications are: number of seats, 3; horsepower, 225 to 285; gross weight, 2,650 lb.; useful load, 925 to 1,000 lb.; maximum speed, 146 to 159 m.p.h.; range, 450 to 575 miles.

Officers of the Waco Company are: Clayton J. Bruckner, president; Lee N. Brutus, vice-president and treasurer; L. E. St. John, secretary; Hugh R. Perry, sales manager, and A. Francis Arcier, chief engineer.





See also specification table on page 82

FLYABOUT D-1, D-2

Aircraft Mechanics, Inc.
Colorado Springs, Col.

A DESCENDANT of the old-time Alexander Aircraft Corporation, Aircraft Mechanics, Inc., has been building Flyabout models for several years. Two models are offered—one the D-1 with Continental A-40 Engine and the other the D-2 with Szekely power plant.

Specifications for the Model D-1 are Number of seats, 2; horsepower, 37; gross weight, 962 lb.; useful load, 389 lb.; maximum speed, 80 m.p.h.; range, 160 miles.

Officers of the company are: P. W. Nichols, president and general manager; W. F. Theis, vice-president and service manager; V. A. Cheevers, secretary. treasurer.

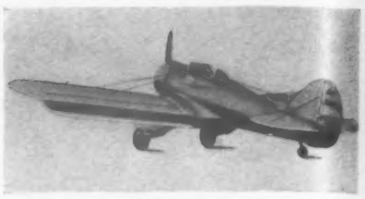
BROWN B-3

Lawrence W. Brown Aircraft Company
Los Angeles, Cal.

NATIONAL air race visitors never fail to admire the performance and finish of Lawrence W. Brown's products. Last year's Miss Los Angeles with Menasco power is illustrated above. A custom-built two-seater (the Brown B-3) is also offered.

Specifications of the Model B-3 are: number of seats, 2; horsepower, 250 at 5,000 ft.; gross weight, 2,650 lb.; useful load, 800 lb.; maximum speed, 205 m.p.h.; range, 600 miles.

Officers of the company are Lawrence W. Brown, president; Col. Frank R. McReynolds, vice-president and sales manager; P. J. Brown, treasurer; V. P. Peters, secretary; Daniel E. Halloway, chief engineer.



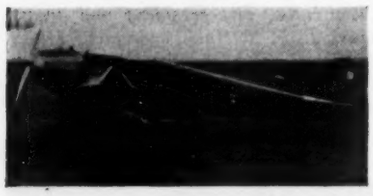
CUNNINGHAM HALL

Cunningham Hall Aircraft Corporation
Rochester, N. Y.

EVER since the Guggenheim safe aircraft competition of 1929 Randolph and Ted Hall have been working on the development of the high-lift wing that they introduced at that time.

This device in a much refined form has been incorporated in a modern low wing open monoplane called the GA-21M. The power plant is a Warner Super Scarab. (For detailed description of the GA-21M, see AVIATION for January, 1935.)

General specifications are: Number of seats, 3; horsepower, 145; gross weight, 2,050 lb.; useful load, 750 lb.; maximum speed, 162 m.p.h.; range, 500 miles.



ARROW MODEL F

Arrow Aircraft & Motors Corporation
Lincoln, Neb.

MOST conventional of the airplanes in the Department of Commerce light plane competition was the Arrow Model F, a two-place low-wing, monoplane with 82 hp. Arrow engine—a converted Ford V-8 developing its rated output at 3,075 r.p.m.

General specifications of the Arrow are: Number of seats, 2; horsepower, 82; gross weight, 1,650 lb.; useful load, 553 lb.; maximum speed, 110 m.p.h.

Officers of the company are: Mark Wood, president, George Woods, first vice-president; F. Pace Woods, second vice-president; John Aldrich, secretary-treasurer; L. E. Miller, general and sales manager; Clark Beisemeier, chief engineer.

CESSNA C34

Cessna Aircraft Company
Wichita, Kan.

THE Cessna offering for 1936 is a trim cantilever cabin monoplane with the Warner Super-Scarab engine as standard power plant. General streamline tires, Auto Fan wheels and brakes, and Cessna shock absorbers are standard.

General specifications are: Number of seats, 4; horsepower, 145; gross weight, 2,220 lb.; useful load, 920 lb.; maximum speed, 162 m.p.h.; range, 550 miles.

Officers of the company are: C. V. Cessna, president; A. K. Longren, vice-president; D. S. Wallace, secretary-treasurer; Dwane L. Wallace, general manager and chief engineer; James P. Verts.

FAHLIN PLYMACOUPE

Fahlin Manufacturing Company
Marshall, Mo.

AS PART of the Air Commerce Bureau's engine development program, the Fahlin Plymacoupe was designed around the converted Plymouth automobile engine. The Plymacoupe is a modification of the Fahlin-Swanson cabin monoplane for two which was introduced in the summer of 1934. The engine in the earlier plane was the British Pobjoy radial air cooled power plant.

Specifications of the Plymacoupe are: Number of seats, 2; horsepower, 80; gross weight, 1,650 lb.; useful load, 575 lb.; maximum speed, 105 m.p.h.; range, 400 miles.

Officers of the Fahlin Company are: Ole Fahlin, president.

See also specification table on page 82

GREAT LAKES 2T1A

Great Lakes Aircraft Corporation
Cleveland, Ohio

ALTHOUGH no major changes have been made in the Great Lakes Trainer, it is still available in the Cirrus powered two-place, tandem, open biplane model familiar to many private owners and school operators throughout the country.

General specifications are: Number of seats, 2; horsepower, 100; gross weight, 1,580 lb.; useful load, 564 lb.; maximum speed, 110 m.p.h.; and range, 370 miles.

Officers of the company are: Charles F. Barndt president and general manager; P. B. Rogers, vice-president and chief engineer; B. D. Morse, secretary and treasurer; C. L. Johnston, sales manager.

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HAMMOND Y

Hammond Aircraft Company
Ypsilanti, Mich.

SPECIFICATIONS and construction details of the improved version of the Hammond Y have not yet been released and we are therefore obliged to limit this treatment to the earlier type—a two-place low wing pusher with outrigger tail and three wheel landing gears. Power plant was the Menasco C-4 Pirate. Specifications include: Number of seats, 2; horsepower, 125; gross weight, 1,750 lb.; useful load, 600 lb.; maximum speed, 110 m.p.h.

Officers of the Hammond Aircraft Company are: Dean B. Hammond, president and general manager; B. F. Hammond, vice-president and secretary; M. C. Haddon, chief engineer.

MISTER MULLIGAN

Howard Aircraft
Chicago, Ill.

ASIDE from its exceptional performance the most remarkable thing about Mr. Mulligan is its conventionality of design. It is a high wing, monoplane of steel, tube, wood and fabric construction powered by a supercharged Pratt & Whitney Wasp with 13.85:1 blower and 6.05:1 compression ratio. A product of the racing-designing team of Benny Howard and Gordon Israel, Mr. Mulligan is the first step toward a high performance four place commercial ship.

Specifications are: Number of seats, 4; horsepower, 550 at 11,000 ft.; gross weight, 4,210 lb.; useful load, 1,610 lb.; maximum speed, 231-292 m.p.h.; range, 1,200 miles.

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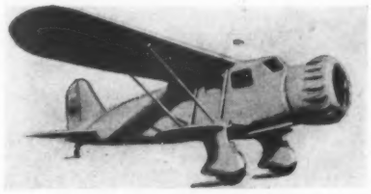


LAIRD LC-EW450, R300

E. M. Laird Airplane Company
Chicago, Ill.

TWO designs for high performance custom built ships are among the current offerings of the Laird Company. Most recent is a six-place cabin monoplane with a duralumin monocoque fuselage and wing flaps. Specifications are: Number of seats, 6; horsepower, 450; gross weight, 5,350 lb.; useful load, 2,145 lb.; maximum speed, 200 m.p.h.; range, 850 miles.

General specifications for the three place open cockpit machine are: Number of seats, 3; horsepower, 300; gross weight, 3,010 lb.; useful load, 1,088 lb.; maximum speed, 175 m.p.h.; range, 550 miles.

Officers of the Laird Company are E. M. Laird, president.

AVIATE

McGaffney Airplane Development Company, Inglewood, Cal.

DESIGNED around a special conversion of the Ford V8 engine, is the McGaffey Aviate, a two place low-wing monoplane of somewhat unusual design with outrigger tail. The engine develops 100 hp. at 3,800 r.p.m. and weighs 480 lb. complete including starter and generator. The engine is equipped with a system of reduction gearing.

General specifications are: Number of seats, 2; horsepower, 100; gross weight, 1,750 lb.; useful load, 583 lb.; maximum speed, 115 m.p.h. and range, 500 miles.

Officers of the company are: N. F. McGaffey, president and F. M. Smith, chief engineer.

•

TRAINER

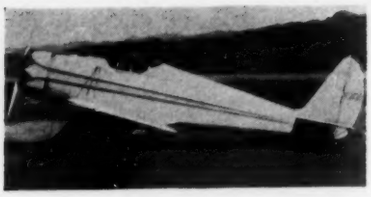
Military Aircraft Corporation
New York, N. Y.

A TWO-PLACE low-wing monoplane trainer is now being offered by the Military Airplanes Corporation. The airplane is designed in several variations, powered with Jacobs, Warner, or Menasco engines. It is available for commercial use.

General specifications are: Number of seats, 2; horsepower, 125-250; gross weight 2022-2550 lb.; useful load, 622-885 lb.; maximum speed, 138-160 m.p.h.; range 410 to 500 miles.

Officers of the company are: Donald deLackner, president; C. Schindler, vice-president (engineering); Lee Gehlback, vice-president (sales); Frank E. Sweetster, secretary; and J. Z. Kaplan, treasurer.

See also specification table on page 82



PASPED SKYLARK

Pasped Aircraft Company
Glendale, Cal.

A NEW Warner-Scarab powered low-wing monoplane called the Skylark has recently been introduced by the Pasped Aircraft Co. Pasped's Skylark has side by side seating accommodations for two passengers and is of ordinary wood and fabric construction.

General specifications are: Number of seats, 2; horsepower, 125; gross weight, 1,800 lb.; useful load, 612 lb.; maximum speed, 140 m.p.h. and range, 545 miles.

Officers of the company are: Fred Pastorius, manager; Stanley Pedersen, chief engineer; W. Waldorf and Edwin C. Knapp, directors.

KITTYHAWK B8

Viking Flying Boat Company
New Haven, Conn.

THE familiar Kittyhawk Biplane continues to be available as a product of the Viking Flying Boat Co. of New Haven. A Kinner B5 engine is standard equipment. Specifications are: Number of seats, 3; horsepower, 125; gross weight, 1,950 lb.; useful load, 772 lb.; maximum speed, 110 m.p.h.; range, 420 miles.

Officers of the company are: Robert E. Gross, president; Courtlandt S. Gross, vice-president and treasurer; Robert Proctor, secretary; F. T. Kurt and C. S. Gross, sales managers; Franklin T. Kurt, chief engineer and J. L. Freed, assistant treasurer and general manager.

WELCH, OW5M, OW7M

Orin Welch Aviation School
Anderson, Ind.

TWO light plane models at prices close to the $1,000 mark are offered by the Orin Welch Aviation School. The Welch models are high wing open or closed monoplanes, powered with Continental A40 or the Welch O-2 engines.

General specifications are: Number of seats, 2; horsepower, 37 to 45; gross weight, 950 lb.; useful load, 410-450 lb.; maximum speed, 96 m.p.h. and range, 300 miles.

Officers of the company are: Orin Welch, president and chief engineer; Ganer Welch, vice-president; Violet Welch, secretary-treasurer; John Welch, sales manager.

ROSE PARRAKEET

Rose Airplane Corporation
Chicago, Ill.

A NEWCOMER in the relatively small group of one-place airplanes is the Rose Parrakeet Model A-1 with the Continental A40 engine. The Parrakeet has been designed for low-cost cross country flying practice, where small operation and low maintenance are desirable. It is a biplane of conventional design and construction.

General specifications are: Number of seats, 1; horsepower, 37 (2,550 ft.); gross weight, 728 lb.; useful load, 272 lb.; maximum speed, 100 m.p.h. at 300 ft. and range, 340 miles.

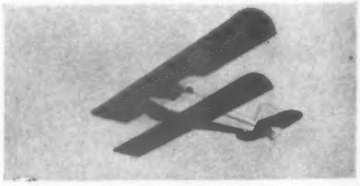
Officers of the company are: J. W. Rose, president and general manager; L. Z. Frazier, secretary; M. W. Corpening, treasurer.

ARROWPLANE

Waldo Waterman
Santa Monica, Cal.

FLOWN from its secret testing grounds in the Mojave Desert to Washington, D. C., the Waterman Arrowplane was accepted last summer by the Air Commerce Bureau as part of its development program. Most radical of the Department projects, the Arrowplane has a three wheel landing gear and no tail. It is a pusher powered with the four cylinder Menasco engine. It is reported to have met all specifications set forth by the Department.

Specifications of the Arrowplane are: Number of seats, 2; horsepower, 95; gross weight, 1,900 lb.; useful load, 590 lb.; maximum speed, 110 m.p.h.; range, 350 miles.



WILEY POST MODEL A

Wiley Post Aircraft Corporation
Oklahoma City, Okla.

OF THE several converted-Ford powered planes described in this directory, only one was available for private use a year ago. It was the Wiley Post Model A with the AL 1000 engine rated 40 hp. at 1,900 r.p.m. The Model A is a two place open biplane of conventional construction priced at $1,438 at factory. Specifications are, number of seats, 2; horsepower, 40; gross weight, 992 lb.; useful load, 411 lb.; maximum speed, 82 m.p.h.; range, 140 miles.

Officers of the company are: Mark Kleedon, vice-president; J. H. Burke, general manager and chief engineer; Thomas J. Ruddy, secretary, treasurer, and sales manager.

See also specification table on page 82

ENGINES for 1936

Aeronautical Corporation of America ..... page 44, 88
Lunken Airport, Cincinnati, Ohio; President, Taylor Stanley; Vice-President and Treasurer, H. V. Fetick; Secretary, Robert A. Taft; Sales Manager, J. C. Welch; Chief Engineer, Roger E. Schlemmer.

Arrow Aircraft & Motors Corporation 40
Lincoln, Neb.; President, Mark Woods; First Vice-President, George Woods; Second Vice-President, F. Pace Woods; Secretary and Treasurer, John Aldrich; Chief Engineer, Clark Beisemeier; General and Sales Manager, L. E. Miller.

Aviation Holding Company 88
Holland, Mich.; President, D. S. Kiskadden; Vice-President, L. D. Buhl; Secretary and Treasurer A. H. Buhl, Jr.; General and Sales Manager, F. E. Bradfield.

Burnelli Aircraft, Ltd. 44, 88
Keyport, N. J.; President, Inglis M. Uppercu; First Vice-President and General Manager, Vincent J. Burnelli; Secretary, Frederick W. Barker; Treasurer, Homer Balenger; Chief Engineer, Renato Contini; Sales Manager, H. R. Boyce.

Continental Motors Corporation 44, 88
Aircraft Engine Division, Detroit, Mich.; President, W. R. Angell; Vice-President, James H. Ferry; Treasurer, B. F. Tobin, Jr.; Secretary, W. C. Keith; Sales Manager, Ray Long; Chief Engineer, N. N. Tilley.

Fahlin Aircraft Company 45
Marshall, Mo.; President, Ole Fahlin.

Jacobs Aircraft Engine Company 45, 88
Pottstown, Pa.; President, J. Story Smith; Vice-President, Albert R. Jacobs and Henry M. McFadgen; Treasurer and Secretary, H. Alvin Cressman.

Kinner Airplane & Motor Corporation, Ltd. 45, 88
Glendale, Cal.; President, Robert Porter; Vice-President, B. L. Graves; Secretary and Treasurer, Roy D. Bayly; Sales Manager, L. Porter, Chief Engineer, C. P. Sander.

Lambert Engine & Machine Company 46, 88
Moline, Ill.; President, C. W. Bunch; Vice-President, J. V. Reynolds; Secretary and Treasurer, E. N. Freel; Sales Manager, C. W. Bunch; Chief Engineer, A. W. Mooney.

LeBlond Aircraft Engine Corporation 46, 88
Cincinnati, Ohio; President, Richard E. LeBlond; Vice-President, William F. Groene; Treasurer, E. G. Schultz; Secretary, Henry C. Pierle; Chief Engineer, William A. Kimsey.

Lycoming Div.—Aviation Manufacturing Corp. 46, 88
Williamsport, Pa.; President, L. B. Manning; Vice-President, R. S. Pruitt; Treasurer, R. K. Grant; Secretary, Harold Kondolf; Sales Manager, George J. Brew; Chief Engineer, Val Cronstedt.

Menasco Manufacturing Company 47, 88
Los Angeles, Cal.; President, A. S. Menasco; Secretary and Sales Manager, Charles F. McReynolds; Chief Engineer, H. G. Townsend.

National Airplane & Motor Company 88
Billings, Mont.; President, A. B. Green; Vice-President, R. J. O'Malley; Treasurer, Jeff. Tingle.

Wiley Post Aircraft Company 88
Oklahoma City, Okla.; General Manager and Chief Engineer, J. H. Burke; Vice-President, Mark Kleedon; Treasurer and Sales Manager, Thomas J. Ruddy.

Pratt & Whitney Aircraft 47, 88
Division of United Aircraft Manufacturing Corporation, East Hartford, Conn.; General Manager, C. W. Deeds; Assistant General Manager, J. C. Ward, Jr.; Engineering Manager, L. S. Hobbs; Chief Engineer, A. V. D. Willgoos; Sales Manager, T. E. Tillinghast.

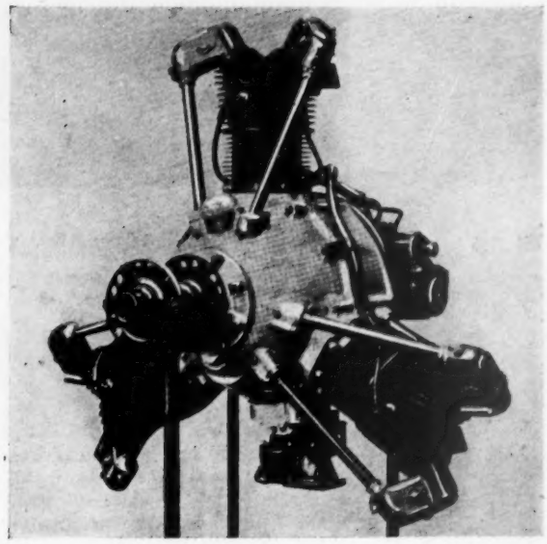
Ranger Engineering Corporation 48, 88
Farmingdale, L. I., N. Y.; President, Sherman M. Fairchild; Vice-President, Walter F. Davis and Duncan B. Cox; Secretary and Treasurer, W. H. Schwebel; Chief Engineer, Walter F. Davis.

Security National Aircraft Corporation 88
Inglewood, Cal.; President and General Manager, W. B. Kinner; Vice-President, Winfield B. Kinner, Jr.; Secretary, H. Park Arnold; Treasurer, Hugh H. Green; Chief Engineer, Max B. Harlow.

Warner Aircraft Corporation 49, 88
Detroit, Mich.; President, William O. Warner; First Vice-President and Sales Manager, Ralph R. Irwin; Second Vice-President, L. A. Faunce; Secretary and Treasurer, W. J. Jarvie; Chief Engineer, Ludwig A. Majneri.

Welch Aircraft Motors 88
Anderson, Ind.; President, Orin Welch; Vice-President, Gomer Welch; Sales Manager, John Welch.

Wright Aeronautical Corporation 49, 88
Paterson, N. J.; President, Guy W. Vaughan; Vice-President and General Manager, Myron B. Gordon; Vice-President of Sales, George Chapline; Vice-President of Engineering, Arthur Nutt; Treasurer, J. J. Donahue; Secretary, E. S. Cramer; Chief Engineer, Philip B. Taylor.



AEROMARINE AR SERIES

Burnelli Aircraft
Keyport, N. J.

THE assets of the old Aeromarine Plane & Motor Company, Inc., have been taken over by Burnelli, and the two models AR 3 and AR 3-40, three-cylinder air-cooled engines, are being continued in production. Standard equipment on the AR 3 is dual ignition, either from a pair of Bosch magnetos or from a dual battery system. On AR 3-40 single or dual mangeto optional.

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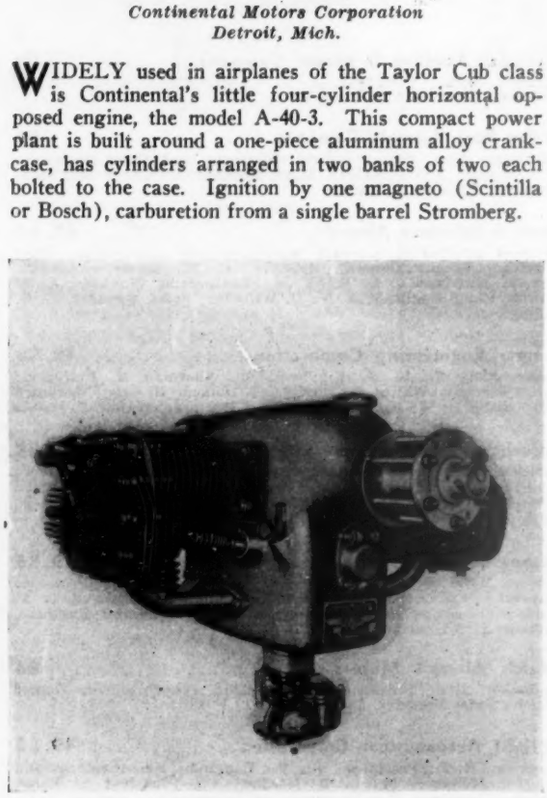
CONTINENTAL A-40

Continental Motors Corporation
Detroit, Mich.

WIDELY used in airplanes of the Taylor Cub class is Continental's little four-cylinder horizontal opposed engine, the model A-40-3. This compact power plant is built around a one-piece aluminum alloy crankcase, has cylinders arranged in two banks of two each bolted to the case. Ignition by one magneto (Scintilla or Bosch), carburetion from a single barrel Stromberg.



ENGINES

See also specification table page 88

AERONCA

Aeronautical Corporation of America
Cincinnati, Ohio

THE Aeronca E-113 engine was developed to meet the needs of this company for a simple and inexpensive power plant for the two-place Aeronca monoplane. The latest model follows usual aircraft engine practice with aluminum crankcases, forged steel cylinder barrels with bolted-on cast aluminum alloy heads. Crankshaft is of the one-piece type mounted on roller bearings.

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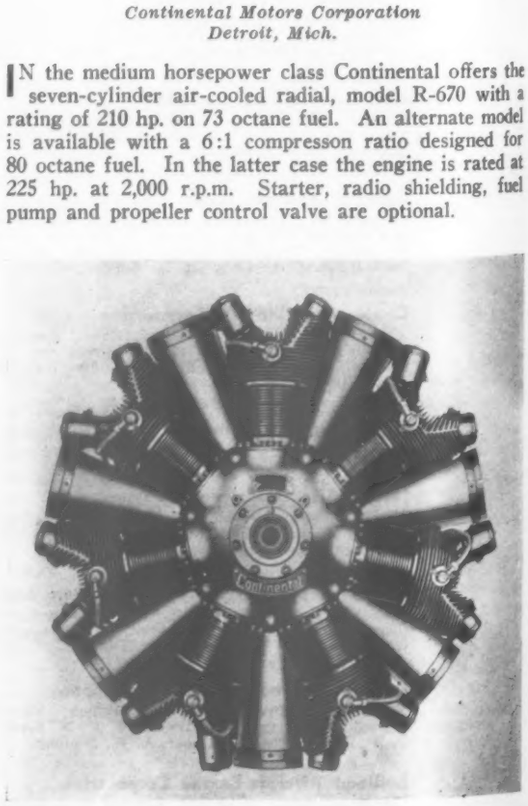
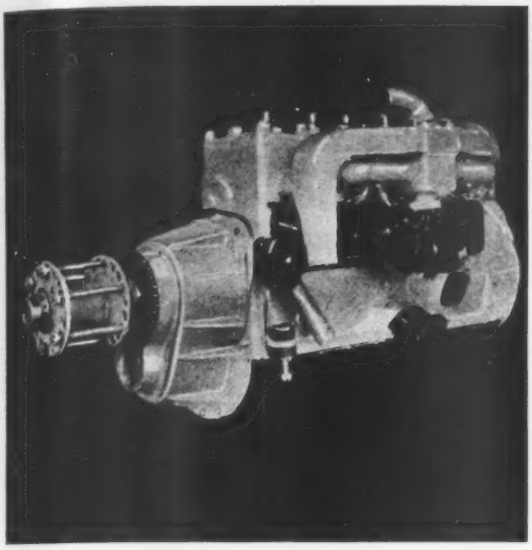
CONTINENTAL R-670

Continental Motors Corporation
Detroit, Mich.

IN the medium horsepower class Continental offers the seven-cylinder air-cooled radial, model R-670 with a rating of 210 hp. on 73 octane fuel. An alternate model is available with a 6:1 compresson ratio designed for 80 octane fuel. In the latter case the engine is rated at 225 hp. at 2,000 r.p.m. Starter, radio shielding, fuel pump and propeller control valve are optional.





FAHLIN-PLYMOUTH

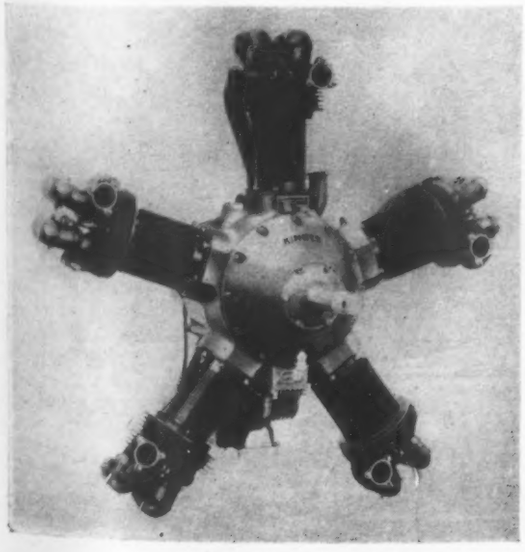
Fahlin Aircraft Company
Marshall, Mo.

AS A part of the Bureau of Air Commerce light airplane development program, the Fahlin Company converted a standard 80 hp. Plymouth automobile engine for arcraft use. Principle changes involve provision of a 2:1 reduction gear for propeller drive, installation of a Scintilla Vertex magneto, installation of an updraft carburetor and a sheet metal exhaust manifold.

KINNER 5-CYLINDER

Kinner Airplane & Motor Corporation
Glendale, Cal.

KINNER five-cylinder engines include the K-5 (100 hp.), the B-5 (125 hp.), the R-5 (160 hp.), the C-5 (210 hp.). Details of all are essentially alike. Characteristic of these engines is the use of five separate camshafts, one for each cylinder, mounted in the crankcase and gear driven from the crankshaft. Crankshafts are all of the one-piece type with split connecting rods.



ENGINES

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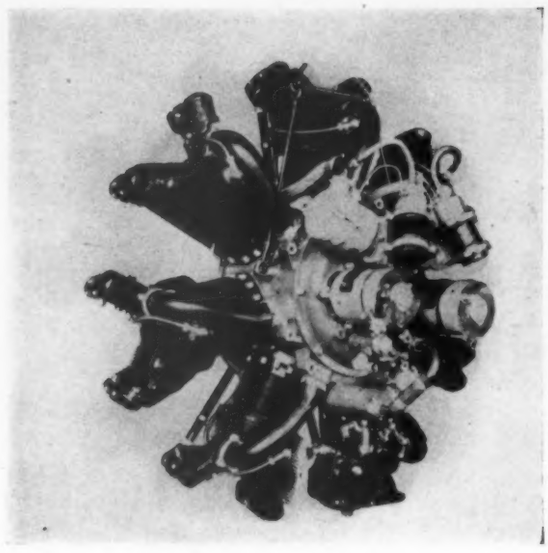


JACOBS L-4 AND L-5

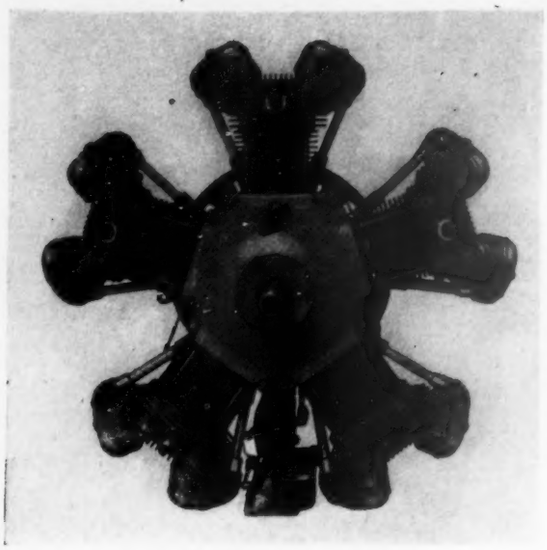
Jacobs Aircraft Engine Company
Pottstown, Pa.

THE Jacobs Company has dropped production of all models of under 200 hp. and has concentrated on two seven-cylinder radials the L-4 and the L-5. Alternate battery or magneto ignition is offered. Provision is made for installation of a hydraulic propeller pitch-control valve. In line with the increasing use of radio on privately-owned airplanes, Breeze shielding is standard.

KINNER 7-CYLINDER

Kinner Airplane & Motor Corporation
Glendale, Cal.

FIRST of the larger Kinner engines to appear was the C-7 of 300 hp. More recently came the SC-7, incorporating GE type supercharger and rated at 370 hp. Cam rings of the conventional radial type are used in the seven-cylinder engines instead of the individual camshafts of the five-cylinder series. A fourteen-cylinder twin-row type was exhibited at the Los Angeles Show.



LAMBERT R-266

Lambert Aircraft Corporation
Moline, Ill.

PRESENT Lambert engine is a development of the old Velie five-cylinder engine which originally appeared in 1928 as the M-5, The current model R 266 shows, however, a great many improvements over its prototype. Dual Scintilla ignition and a single Stromberg carburetor are standard equipment. Crankshaft is of the two-piece type with solid master rod.

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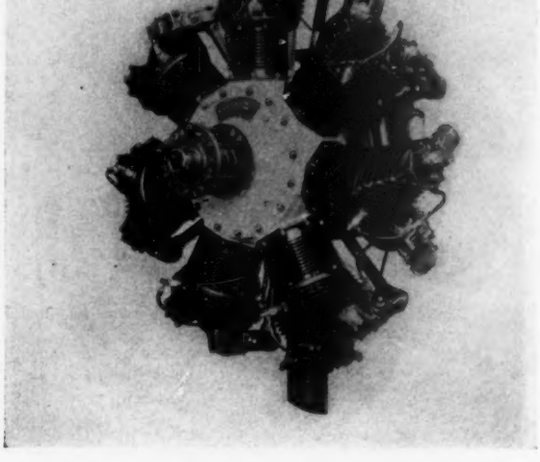
LE BLOND 110

LeBlond Aircraft Engine Corporation
Cincinnati, Ohio.

THE LeBlond 110 is similar in general arrangement to the 70 and the 85 but has seven cylinders instead of five. Cylinder construction is different, however, being of the composite steel barrel and aluminum head type. Crankshaft is in one piece and master connecting rods are of the split type. As in the smaller engines, a single row cam actuates both the intake and the exhaust.



ENGINES

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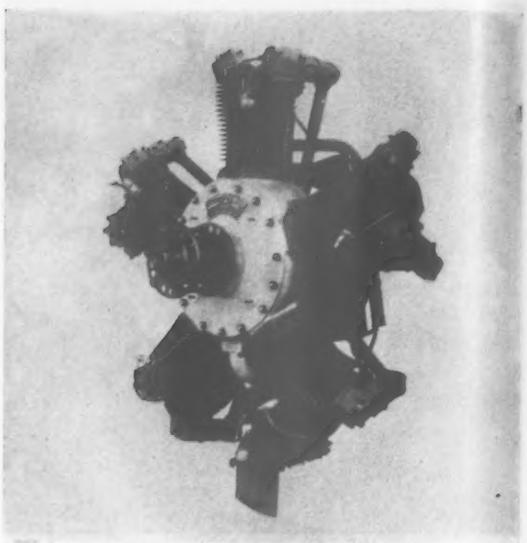

LE BLOND 70 AND 85

LeBlond Aircraft Engine Corporation
Cincinnati, Ohio.

FIVE-CYLINDER LeBlond engines are put up in two models, the 70 and the 85. The chief difference between the two engines is in the bore and displacement. Cylinders are one-piece construction of cast iron. Crankshafts are one piece with split master rod bearings. Crankcase is an aluminum alloy casting with intake manifold cast integral.

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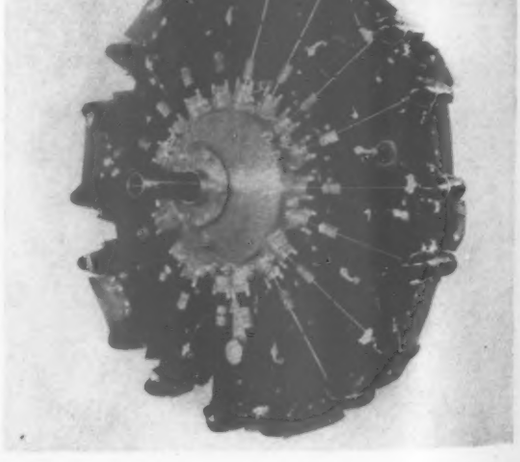
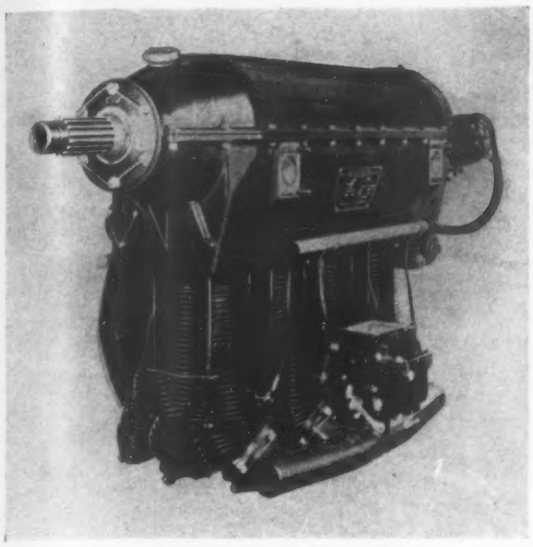
LYCOMING R-680

Aviation Manufacturing Corporation
(Lycoming Division) Williamsport, Pa.

THE model R-680 Lycoming is widely used in military training aircraft and also is standard equipment on the one, two and three-engined Stinson airplanes. It is essentially a transport type engine. It is produced in four distinct models, the R-680-2 (240 hp.), the R-680-5 (260 hp.), the R-680-6 (245 hp.) and the R-680-4 (225 hp.).





MENASCO PIRATE

Menasco Manufacturing Company
Los Angeles, Cal.

MENASCO pioneered in the development of the inverted-in-line engines in the United States. The four cylinder-in-line Pirate series include the B-4 (95 hp.), the C-4 (125 hp.) and the C-4S (150 hp.). The latter model is similar in detail to the first two, but is supercharged. It has had wide use in racing and other special purpose airplanes during the last few years.

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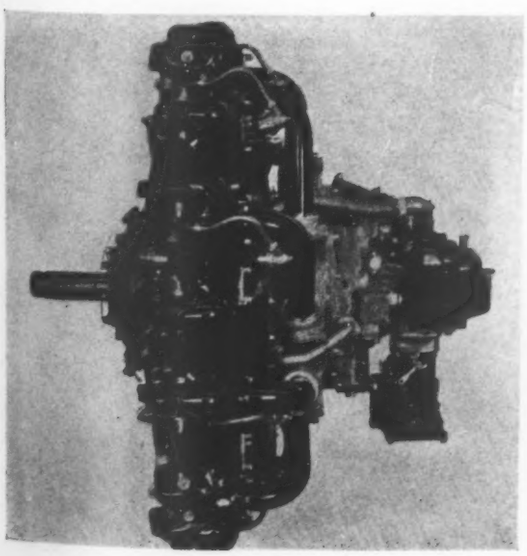
PRATT & WHITNEY WASP JR.

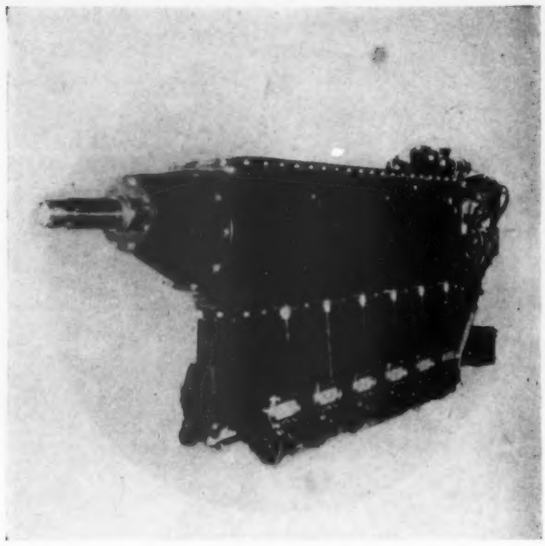
Pratt & Whitney Aircraft Division
Hartford, Conn.

SMALLEST of the Pratt & Whitney family is the Model SB Wasp Jr. It appears in one model only with a cruising rating of 300 hp. at 9,600 ft. and a take-off rating of 450 hp. For continuous operation it is rated at 400 hp. It embodies all the standard features of the larger Wasp and Hornet engines, except automatic valve gear lubrication, automatic mixture control.



ENGINES

See also specification table page 88



MENASCO BUCCANEER

Menasco Manufacturing Company
Los Angeles, Cal.

MENASCO six-cylinder in-line inverted engines include the B-6 (160 hp.) and the B-6S (200 hp.), a supercharged model. Latest model is a "Super-Buccaneer," the Model C-6S-4 rated at 250 hp. at 2,350 r.p.m. at 5,000 ft. This engine is very similar to the B-6S except that cylinders and pistons are interchangeable with the C-4 and C-4S Pirate.

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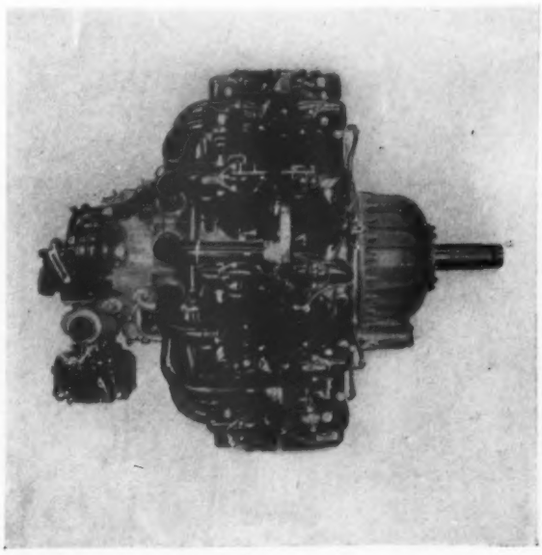
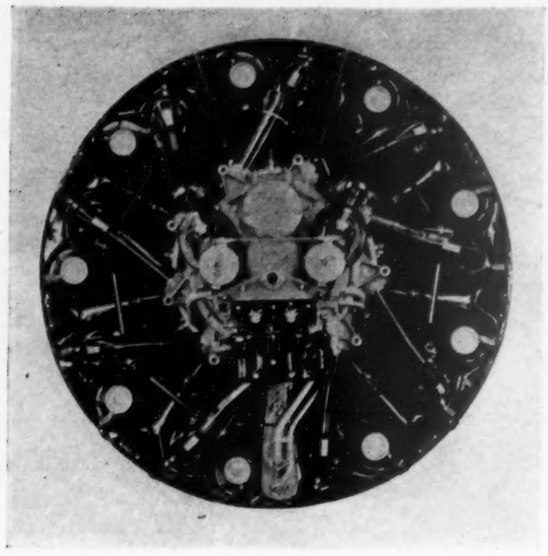
PRATT & WHITNEY TWIN WASP JR.

Pratt & Whitney Aircraft Division
Hartford, Conn.

ALTHOUGH a great deal of development work is going forward on twin row engines, most of it is on confidential status and few details can be released. The only engine of the Twin Wasp Jr. series that has been released for commercial use is the SA-1-G illustrated herewith. It is put up in a geared and supercharged form only.





PRATT & WHITNEY WASP

Pratt & Whitney Aircraft Division
Hartford, Conn.

STANDARD power plant for many an airline for the last five years has been the Wasp in one of its several forms. The long familiar C-1 Wasp has now been replaced by the TD-1 in current production. The latest is the S series which in its several forms has a basic rating of 550 hp. with maximum available for take-off up to 600 hp.

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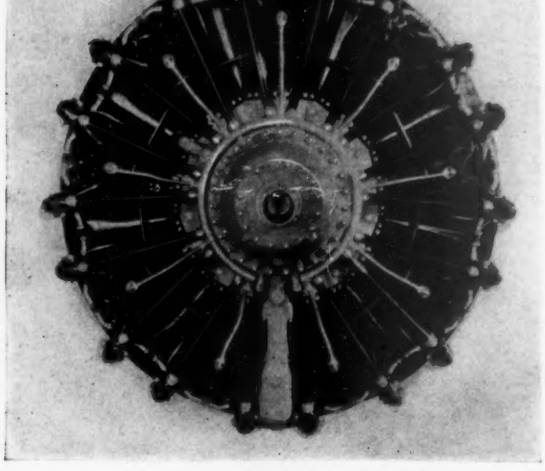
PRATT & WHITNEY HORNET

Pratt & Whitney Aircraft Division
Hartford, Conn.

UNTIL the advent of the highly supercharged and the twin row Wasps the Hornet series represented the most powerful of the Pratt & Whitney products. Seven models of this well known engine are now available commercially, are detailed in the accompanying specification tables (page 88). Direct and geared forms are available. All engines are structurally similar.



ENGINES

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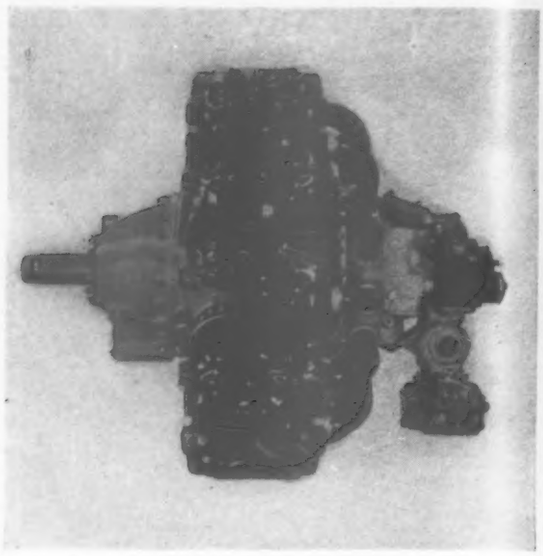

PRATT & WHITNEY TWIN WASP

Pratt & Whitney Aircraft Division
Hartford, Conn.

THE same conditions of secrecy imposed by the Navy that apply to the Twin Wasp Jr. series apply also to the largest of the fourteen-cylinder class, the 1,830 cu.in. Twin Wasp. The Model S1A4-G is illustrated and specified in the accompanying tables. The only commercial application of these engines so far has been in the three Martin 130 flying boats.

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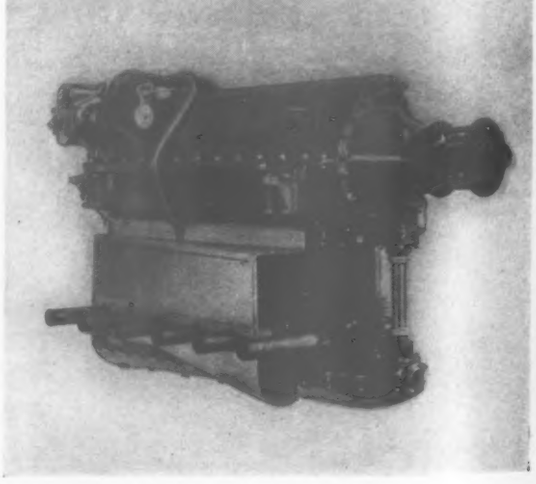
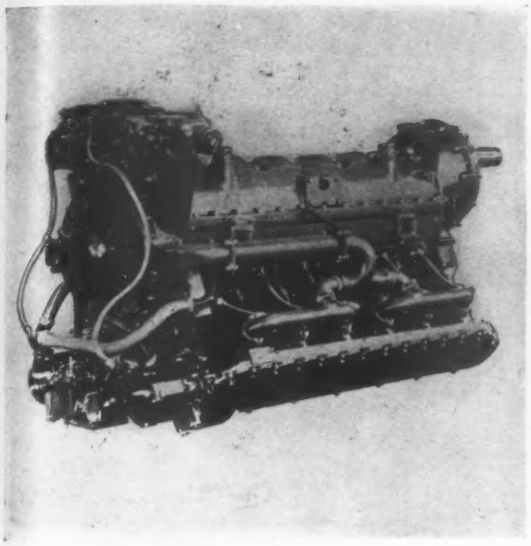
RANGER—SIX

Ranger Engineering Corporation
Farmingdale, L. I.

WITHIN the past year Fairchild has come back into the engine market with two new series of Ranger engines of which the 6-390-B is illustrated herewith. At present the six-cylinder models are available with direct drive and without supercharging. Characteristic is the overhead cam shaft, bevel gear driven from the output end of the engine.





RANGER—TWELVE

Ranger Engineering Corporation
Farmingdale, N. Y.

THE V-series inverted twelve-cylinder Ranger engines have most of their parts interchangeable with the six-cylinder series. Three variations are available, a direct drive unsupercharged, a direct drive supercharged, and a geared and supercharged model. Structural details of all models are similar. For details of the variation see the specification tables.

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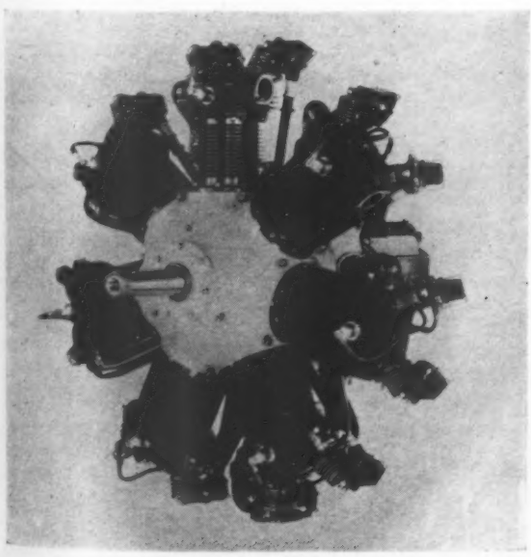
WARNER SCARAB

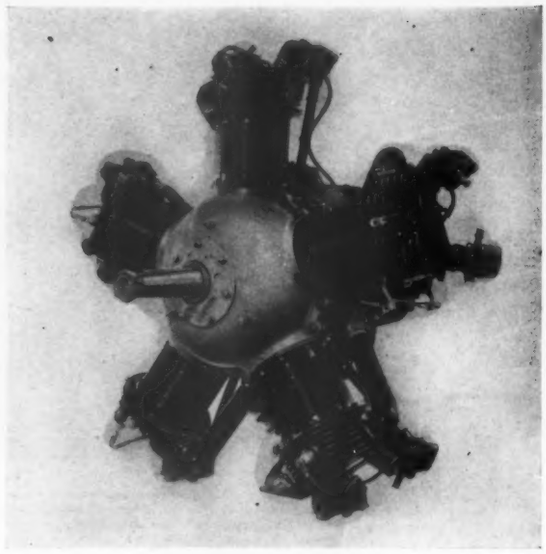
Warner Aircraft Company
Detroit, Mich.

THE seven-cylinder Warner engines appear in two forms, the Scarab at 125 hp. rating and the Super-Scarab at 145 hp. Both engines are identical except that the Super has a greater displacement and a slightly higher compression ratio. Crankshaft is of the one-piece type with split master rod fitted. Cylinders are composite steel barrel and aluminum head.



ENGINES

See also specification table page 88



WARNER SCARAB JR.

Warner Aircraft Company
Detroit, Mich.

THE Scarab Jr. series is basically the same as the larger engine (Warner Scarab) except that it is put up with five cylinders instead of seven, which brings the horsepower down to 90. Many of the parts are interchangeable with the larger engine. Ignition is from two Scintilla magnetos, carburetion from a single Holly carburetor.

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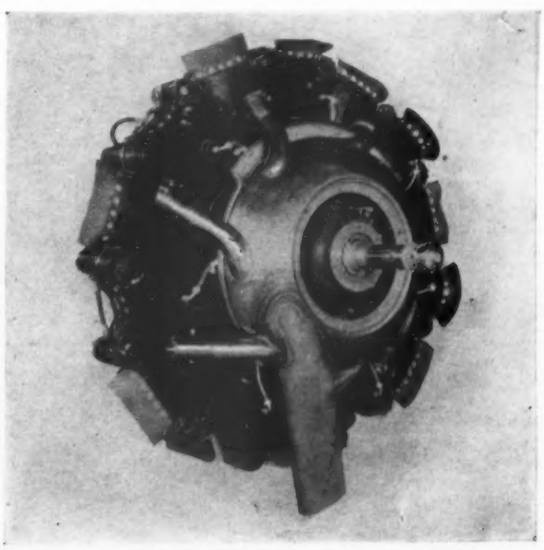
WRIGHT WHIRLWIND—7

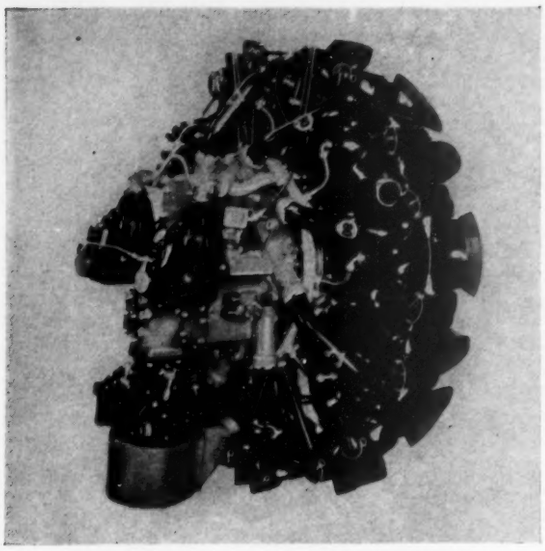
Wright Aeronautical Corporation
Paterson, N. J.

FOUR variations of the well known seven-cylinder Whirlwind Series are now available ranging in power from 235 hp. to 320 hp. These engines all have the same basic dimensions and displacement (756 cu.in.) with the variation and output secured by varying degrees of supercharging and changes in compression ratio.



ENGINES

See also specification table page 88



WRIGHT WHIRLWIND R-975

Wright Aeronautical Corporation
Paterson, N. J.

THE nine-cylinder Whirlwind series breaks into a higher power class, the three models ranging from 330 hp. to 420 hp. at sea level. These engines are similar in detail to the seven-cylinder series. They carry the loose counterweight dynamic damper, automatic valve gear lubrication and full pressure baffling. All models are supercharged.

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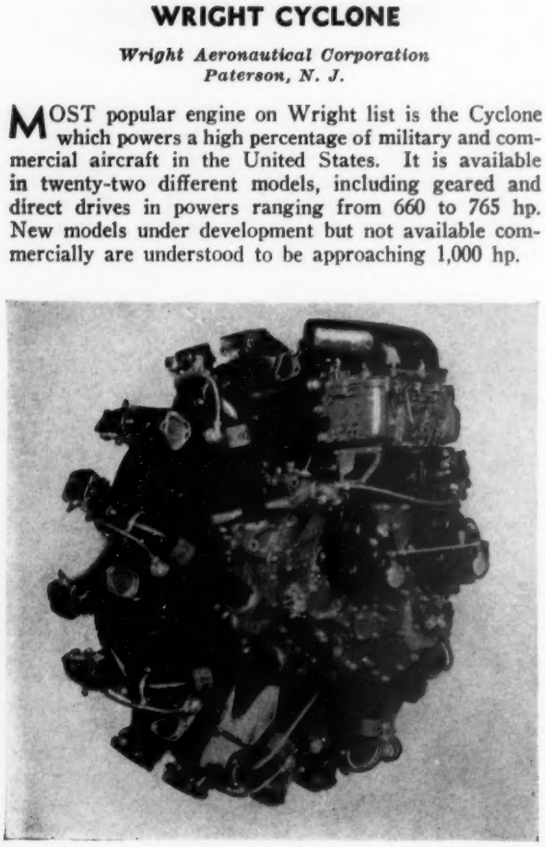
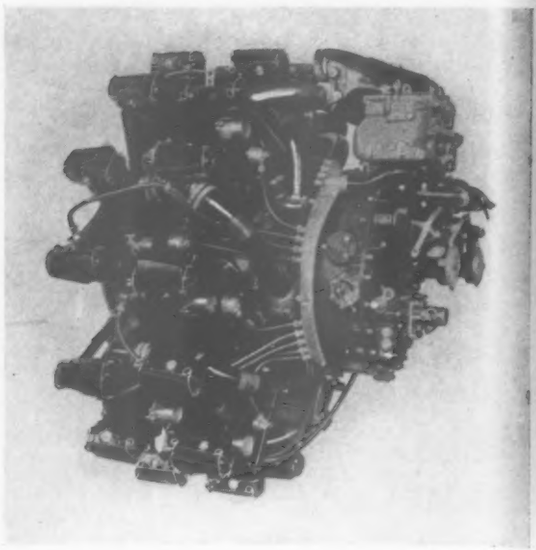
WRIGHT CYCLONE

Wright Aeronautical Corporation
Paterson, N. J.

MOST popular engine on Wright list is the Cyclone which powers a high percentage of military and commercial aircraft in the United States. It is available in twenty-two different models, including geared and direct drives in powers ranging from 660 to 765 hp. New models under development but not available commercially are understood to be approaching 1,000 hp.





WRIGHT 14-CYLINDER WHIRLWIND

Wright Aeronautical Corporation
Paterson, N. J.

EIGHT models of twin Whirlwinds are now available. Depending on degree of supercharging and compression ratios, power ranges from 575 to 700 hp. These engines are available in both geared and direct drive. The details of the several models appear in the specification tables. All models are basically similar in structural detail.

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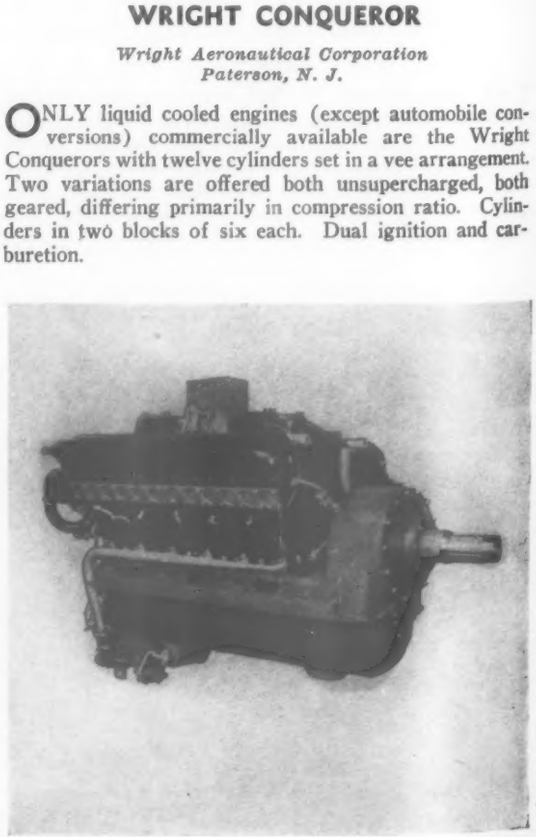
WRIGHT CONQUEROR

Wright Aeronautical Corporation
Paterson, N. J.

ONLY liquid cooled engines (except automobile conversions) commercially available are the Wright Conquerors with twelve cylinders set in a vee arrangement. Two variations are offered both unsupercharged, both geared, differing primarily in compression ratio. Cylinders in two blocks of six each. Dual ignition and carburetion.



ACCESSORIES for 1936

AIRCRAFT ACCESSORIES

Batteries

C. F. Burgess Laboratories, Inc., 111 West Monroe Street, Chicago.
Electric Storage Battery Company, Philadelphia, Pa.
Gould Storage Battery Corporation, Depew, N. Y.
Philadelphia Storage Battery Company, Philadelphia, Pa.
Reading Batteries, Inc., Reading, Pa.
Willard Storage Battery Company, 274 East 131st Street, Cleveland.

Cameras and Supplies

Aero Service Corporation, 1612 Chancellor Street, Philadelphia, Pa.
Bell & Howell Company, 1801 Larchmont Avenue, Chicago, Ill.
Eastman Kodak Company (film), Rochester, N. Y.
Graflex Division, Eastman Kodak Company, Rochester, N. Y.
Fairchild Aerial Camera Corporation, Woodside, L. I., N. Y.
Skyview Camera Company, Municipal Airport, Cleveland, Ohio.

Controls

Arens Controls, 1150 West Marquette Road, Chicago, Ill.
Brewster Aeronautical Corporation, Long Island City, N. Y.
Lobdell - Emery Manufacturing Company, Alma, Mich.
Shakespeare Products Company, Kalamazoo, Mich.

Electrical Equipment

Breeze Corporations, 24-46 South Sixth Street, Newark, N. J.
Cannon Electric Development, West Avenue 33, Los Angeles, Cal.
Eclipse Aviation Corporation, East Orange, N. J.
General Electric Company, Schenectady, N. Y.
Heintz & Kaufman, Ltd., South San Francisco, Cal.
Harvey-Hubbell & Company, Inc., Bridgeport, Conn.
Littlefuse Laboratories, 4238 Lincoln Avenue, Chicago, Ill.
Pioneer Instrument Company, Inc., 754 Lexington Avenue, Brooklyn, N. Y.
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Fire Extinguishers

Pyrene Manufacturing Company, 560 Balmont Avenue, Newark, N. J.
Walter Kidde & Company, Inc., 140 Cedar Street, New York City.
Phister Manufacturing Company, 901-03 Broadway, Cincinnati, Ohio.

Floats

Brewster Aeronautical Corporation, Long Island City, N. Y.
Edo Aircraft Corporation, 13-10 111th Street, College Point, N. Y.

Instruments

Aero Instrument Company, 3678 West 138th Street, Cleveland, Ohio.
Aeromarine Instrument Company, Inc., 370 Gerard Avenue, New York.
American Paulin System, Maple Avenue, Los Angeles, Cal.
Barbour-Stockwell Company, 205 Broadway, Cambridge, Mass.
Boston Auto Gage, 28 Clapp Avenue, Pittsfield, Mass.
Chelsea Clock Company, Chelsea, Mass.
Consolidated Ashcroft Hancock Company, Inc., 11 Elias Street, Bridgeport, Conn.
Elgin National Watch Company, Elgin, Ill.
Foxboro Company, Foxboro, Mass.
Julien P. Friez & Sons, Baltimore.
Jaeger Watch Company, 304 East 45th Street, New York.
Kollsman Instrument Company, 1 Junius Street, Brooklyn, N. Y.
Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia, Pa.
The Lewis Engineering Company, Naugatuck, Conn.
Liquidometer Corporation, Long Island City, N. Y.
Moto Meter Gauge & Equipment Corporation, La Crosse, Wis.
New Haven Clock Company, New Haven, Conn.
Pacific Scientific Instrument Company, 1206 Maple Avenue, Los Angeles, Cal.
Pioneer Instrument Company, Inc., 754 Lexington Avenue Brooklyn, N. Y.
Rieker Instrument Company, 1919 Fairmount Avenue, Philadelphia.
E. S. Ritchie & Sons, Inc., 112 Cypress Street, Brookline, Mass.
Shore Instrument & Manufacturing Company, Jamaica, N. Y.
Sperry Gyroscope Company, Inc., Manhattan Bridge Plaza, Brooklyn.
Star Compass Company, East Milton, Mass.
United States Gauge Company, 44 Beaver Street, New York City.
Waltham Clock Company, Waltham, Mass.
Weston Electrical Instrument Corporation, Newark, N. J.

Lighting Equipment

Grimes Manufacturing Company, Urbana, Ohio.
The Pyle - National Company, North Kostner Avenue, Chicago, Ill.
S. & M. Lamp Company, 118 West 36th Street, Los Angeles, Cal.

Parachutes

FOLLMER, CLOGG COMPANY, Lancaster, Pa.
IRVING AIR CHUTE COMPANY, INC., 1670 Jefferson Avenue, Buffalo, N. Y.
SWITLIK PARACHUTE & EQUIPMENT COMPANY, South Broad and Dye Streets, Trenton, N. J.
TRIANGLE PARACHUTE COMPANY, 4917 Carthage Avenue, Cincinnati, Ohio.

Propellers

AMERICAN PROPELLER COMPANY, South Bend, Ind.
CALIFORNIA PROPELLER COMPANY, LTD., West Slauson Avenue, Los Angeles, Cal.
CURTISS AEROPLANE & MOTOR COMPANY, Buffalo, N. Y.
FLOTTORP PROPELLER COMPANY, Linden Avenue, Grand Rapids, Mich.
GARDNER PROPELLER COMPANY, Circle Avenue, Forest Park, Ill.
HAMILTON STANDARD PROPELLERS DIVISION, UNITED AIRCRAFT MANUFACTURING CORPORATION, East Hartford, Conn.
HARTZELL PROPELLER COMPANY, Division of Hartzell Industries, Inc., Piqua, Ohio.
LYCOMING - SMITH MANUFACTURING COMPANY, Williamsport, Pa.
MARSHALL-FAHLIN PROPELLER COMPANY, Marshall, Mo.
PITTSBURGH SCREW & BOLT CORPORATION, Pittsburgh, Pa.
SENSENICH BROTHERS, Lititz, Pa.
STONE PROPELLER COMPANY, Wichita, Kan.
STORY, GAWLEY COMPANY, San Fernando Road, Glendale, Cal.
SUPREME PROPELLER, Wichita, Kan.

Radio

AERONAUTICAL RADIO COMPANY, Roosevelt Field, Mineola, N. Y.
AIRCRAFT RADIO CORPORATION, Boonton, N. J.
BREEZE CORPORATIONS, Newark, N. J.
THE BRUSH DEVELOPMENT COMPANY, 1892 East 40th Street, Cleveland.
CANNON ELECTRIC DEVELOPMENT, West Avenue 33, Los Angeles, Cal.
FAIRCHILD AVIATION CORPORATION, Woodside, L. I., N. Y.
HARVEY RADIO LABORATORIES, 12 Boylston Street, Boston, Mass.
HEINTZ & KAUFMAN, LTD., South San Francisco, Cal.
LEAR DEVELOPMENTS, INC., 125 West 17th Street, New York City.
RADIOMARINE CORPORATION OF AMERICA, 66 Broad Street, New York.
RADIO NAVIGATIONAL INSTRUMENT COMPANY, 22 East 40th Street, New York.
RCA MANUFACTURING COMPANY, INC., Camden, N. J.
SEABURY & SONS, INC., Boonton, N. J.
TRIMM RADIO MANUFACTURING COMPANY, 1528 Armitage Avenue, Chicago, Ill.
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, East Pittsburgh, Pa.
WESTERN ELECTRIC COMPANY, INC., 195 Broadway, New York City.

Shock Struts

AUTOMOTIVE FAN & BEARING COMPANY, Fern and Wildwood Streets, Jackson, Mich.
BENDIX PRODUCTS CORPORATION, South Bend, Ind.
THE CLEVELAND PNEUMATIC TOOL COMPANY, 3734 East 78th Street, Cleveland, Ohio.
INDUSTRIAL ENGINEERING & MANUFACTURING COMPANY, 239 John Street, Bridgeport, Conn.
RUSSELL MANUFACTURING COMPANY, Middletown, Conn.
THE WARNER AIRCRAFT CORPORATION, 20263 Hoover Avenue, Detroit.

Tires

FIRESTONE TIRE & RUBBER COMPANY, Akron, Ohio.
GENERAL TIRE & RUBBER COMPANY, Akron, Ohio.
THE B. F. GOODRICH COMPANY, Akron, Ohio.
THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio.

Wheels and Brakes

AIRCRAFT PRODUCTS CORPORATION, Detroit, Mich.
AIR TRANSPORT EQUIPMENT, INC., Roosevelt Field, Garden City, N. Y.
BENDIX PRODUCTS CORPORATION, South Bend, Ind.
DAYTON WIRE WHEEL COMPANY, Miami Chapple Road, Dayton, Ohio.
THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio.
HAYES INDUSTRIES, INC., Jackson, Mich.
KELSEY-HAYES WHEEL COMPANY, 3600 Military Avenue, Detroit.
SHINN DEVICES CORPORATION, Pittsburgh-Butler Airport, Butler, Pa.
VARIETY MANUFACTURING COMPANY, West Third Street, Dayton, Ohio.
THE WARNER AIRCRAFT CORPORATION, 20263 Hoover Avenue, Detroit.

Miscellaneous

AIR CRUISERS (flotation gear), Clifton, N. J.
RODNEY B. CAMPBELL & COMPANY (hydraulic pumps), 1632-34 East Nadeau Street, Los Angeles, Cal.
ENGEL AIRCRAFT SPECIALTIES (cowling, fairings, etc.), Glendale, Cal.
FEDERAL AIRCRAFT WORKS (skiis), Minneapolis, Minn.
HILL AIRCRAFT STREAMLINERS COMPANY (cowling, fairings, etc.), 814-16 Reedy Street, Cincinnati, Ohio.
INTERNATIONAL FLARE-SIGNAL COMPANY (aircraft flares), Tippecanoe City, Ohio.
RUSSELL MANUFACTURING COMPANY (belting, packing, etc.), Middletown, Conn.

AIRPORT ACCESSORIES

Buildings

AUSTIN COMPANY, Cleveland, Ohio.
BLAW-KNOX COMPANY, 652 Farmers Bank Building, Pittsburgh, Pa.
INTERNATIONAL-STACEY CORPORATION, Michigan and Buttles Avenues, Columbus, Ohio.
MARYLAND METAL BUILDING COMPANY, Race and McComas Streets, Baltimore, Md.
H. H. ROBERTSON COMPANY, Grant Building, Pittsburgh, Pa.
TRUSCON STEEL COMPANY, Youngston, Ohio.

Fences

ANCHOR FENCE POST COMPANY, Eastern Avenue, Baltimore, Md.
CYCLONE FENCE COMPANY, Foss Park Avenue, North Chicago, Ill.
PAGE FENCE COMPANY, Bridgeport, Conn.

Fire Extinguishers

C-O-TWO FIRE EQUIPMENT COMPANY, Pyrene Building, Newark, N.J.
FYR-FYTER COMPANY, Dayton, Ohio.
AMERICAN LAFRANCE & FOAMITE CORPORATION, Elmira, N. Y.
GARRISON ENGINEERING CORPORATION, Waterbury, Conn.
PYRENE MANUFACTURING COMPANY, 560 Belmont Avenue, Newark, N. J.
STEMPEL FIRE EXTINGUISHER MANUFACTURING COMPANY, Twentieth and Ferry Streets, St. Louis, Mo.

Fuel Systems and Accessories

AQUA SYSTEMS, INC., 2443 Third Avenue, New York City.
S. F. BOWSER & COMPANY, INC., Fort Wayne, Ind.
GILBERT & BARKER MANUFACTURING COMPANY, Springfield, Mass.
B. F. GOODRICH RUBBER COMPANY, Akron, Ohio.
PROTECTO SEAL COMPANY, 1906-24 South Western Avenue, Chicago.
RAYBESTOS - MANHATTAN COMPANY, INC., Passaic, N. J.
STEEL PRODUCTS ENGINEERING COMPANY, Dakota Avenue and Columbia Street, Springfield, Ohio.
SWIFT LUBRICATOR COMPANY, Elmira, N. Y.

Lights and Accessories

AMERICAN GAS ACCUMULATOR, Elizabeth, N. J.
AMERICAN CABLE COMPANY, 230 Park Avenue, New York, N. Y.
AIR-WAYS EQUIPMENT CORPORATION, Milwaukee, Wis.
BARTOW BEACONS, INC., 1605 Walnut Street, Philadelphia, Pa.
B-B-T. CORPORATION OF AMERICA, 1029 Newark Avenue, Elizabeth, N. J.
BULL-DOG ELECTRIC PRODUCTS COMPANY, Jos. Campau Avenue, Detroit.
CROUSE-HINDS COMPANY, Syracuse, N. Y.
CUTLER HAMMER COMPANY, Twelfth and St. Paul, Milwaukee, Wis.
GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York City.
GENERAL ELECTRIC COMPANY, Schenectady, N. Y.
KELLOGG SWITCHBOARD & SUPPLY, 1066 West Adams, Chicago, Ill.
LAKEWOOD ENGINEERING COMPANY, Columbus, Ohio.
NATIONAL CARBIDE SALES CORPORATION, Lincoln Building, New York.

CLAUDE NEON LIGHTS INC., 41 East 42d Street, New York, City.
THE PYLE - NATIONAL COMPANY, North Kostner Avenue, Chicago, Ill.
ROSE AVIATION CORPORATION, 45 West 45th Street, New York City.
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, East Pittsburgh, Pa.

Radio (Airport)

GENERAL ELECTRIC COMPANY, Schenectady, N. Y.
HARVEY RADIO LABORATORIES, 12 Boylston Street, Boston, Mass.
RCA MANUFACTURING COMPANY, INC., Camden, N. J.
WESTERN ELECTRIC COMPANY, 195 Broadway, New York City.
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, East Pittsburgh, Pa.

Tractors

THE BAKER-RAULING COMPANY, Cleveland, Ohio.
CATERPILLAR TRACTOR COMPANY, Peoria, Ill.
CLARK TRUCTRACTOR COMPANY, Battle Creek, Mich.
CLEVELAND TRACTOR COMPANY, Cleveland, Ohio.

Miscellaneous

AMERICAN AIRPORT EQUIPMENT COMPANY, 5958 Washington Boulevard, Chicago, Ill.
JULIEN P. FRIEZE & SONS, INC. (weather instruments), Baltimore.
ALLITH - PROUTY MANUFACTURING COMPANY (door hardware), Danville, Ill.

ENGINE ACCESSORIES

Carburetors

BENDIX AVIATION CORPORATION, South Bend, Ind.
HOLLEY CARBURETOR COMPANY, Vancouver Avenue, Detroit, Mich.

Exhaust Manifolds

AMERICAN TUBE BENDING COMPANY, New Haven, Conn.
BREWSTER AERONAUTICAL CORPORATION, Long Island City, N. Y.
BUHL STAMPING COMPANY, 2730 Scotten Avenue, Detroit, Mich.
ENGEL AIRCRAFT SPECIALTIES, 1729 Standard Avenue, Glendale, Cal.
HILL AIRCRAFT STREAMLINERS COMPANY, 814-816 Reedy Street, Cincinnati, Ohio.
SOLAR AIRCRAFT COMPANY, LTD., 1212 West Juniper Street, San Diego, Cal.

Fuel Systems and Accessories

EVANS APPLIANCE COMPANY, 253 Vinewood Avenue, Detroit, Mich.
PROTECTOSEAL COMPANY, 1906-24 South Western Ave., Chicago, Ill.
PUMP ENGINEERING & SUPPLY COMPANY, 3015 East 61st Street, Cleveland, Ohio.
ROMEC PUMP COMPANY, Elyria, Ohio.
THE STEEL PRODUCTS ENGINEERING COMPANY, Springfield, Ohio.
UNITED AIRCRAFT PRODUCTS, Dayton, Ohio.

Ignition Shielding and Wiring

AMERICAN CABLE COMPANY, 230 Park Avenue, New York City.
BELDEN CABLE & ROPE COMPANY, 4647 West Van Buren Street, Chicago.
BREEZE CORPORATIONS, INC., 24 South Sixth Street, Newark, N. J.
DELCO AVIATION CORPORATION, Sidney, N. Y.
GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York City.
PACKARD ELECTRIC CORPORATION, Warren, Ohio.
SCINTILLA MAGNETO COMPANY, Sidney, N. Y.

Magnetos and Battery Ignition

BERLING MAGNETO COMPANY, Buffalo, N. Y.
SCINTILLA MAGNETO COMPANY, INC., Sidney, N. Y.
UNITED AMERICAN BOSCH CORPORATION, Springfield, Mass.

Pistons and Rings

AMERICAN HAMMERED PISTON RING COMPANY, Baltimore, Md.
THE DURO COMPANY, 224 Natoma Street, San Francisco, Cal.
THE OHIO PISTON COMPANY, 5337 St. Clair Avenue, Cleveland, Ohio.
THE PERFECT CIRCLE COMPANY, Hagerstown, Ind.
SEALED POWER CORPORATION, Muskegon, Mich.
SIMPLEX PISTON RING SALES COMPANY, Cleveland, Ohio.
U. S. HAMMERED PISTON RING COMPANY, INC., Paterson, N. J.
WILKENING MANUFACTURING COMPANY, Philadelphia, Pa.

Radiators

THE G. & O. MANUFACTURING COMPANY, 138 Winchester Avenue, New Haven, Conn.
HARRISON RADIATOR CORPORATION, Lockport, N. Y.
MCCORD RADIATOR & MANUFACTURING CORPORATION, Detroit, Mich.

Spark Plugs

CHAMPION SPARK PLUG COMPANY, Toledo, Ohio.
THE B. G. CORPORATION, 136 West 52d Street, New York City.
AC SPARK PLUG COMPANY, 930 Harriet Street, Flint, Mich.

Tanks

ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa.
BREEZE CORPORATIONS, 24-46 South Sixth Street, Newark, N. J.
FLEETWINGS, INC., Bristol, Pa.
HILL AIRCRAFT STREAMLINERS COMPANY, 814 Reedy Street, Cincinnati.
MAGOSY & BUSCHER, 120 Walker Street, New York City.
PARAMOUNT WELDED PRODUCTS COMPANY, 341 39th Street, Brooklyn, N. Y.

Valves

JADSON MOTOR PRODUCTS COMPANY, 8354 Wilcox Avenue, Bell, Cal.
THOMPSON PRODUCTS, INC., 2196 Clarkwood Road, Cleveland, Ohio.
WILCOX - RICH CORPORATION, 9771 French Road, Detroit, Mich.

Miscellaneous

AIR-MAZE CORPORATION (air cleaners), 310 Caxton Building, Cleveland, Ohio.
AIR TRANSPORT EQUIPMENT, INC. (miscellaneous parts), Roosevelt Field, Garden City, L. I., N. Y.
THE CUNO ENGINEERING CORPORATION (oil filters), Meriden, Conn.
IDEAL CLAMP MANUFACTURING COMPANY (hose clamps), 200 Bradford street, Brooklyn, N. Y.
MOTOR IMPROVEMENTS, INC. (oil and fuel filters), Newark, N. J.
SHINN DEVICES CORPORATION (miscellaneous parts), Butler, Pa.
S. S. WHITE DENTAL MANUFACTURING COMPANY (tachometer drives), 211 South Twelfth Street, Philadelphia, Pa.
WITTEK MANUFACTURING COMPANY, (hose clamps) 4305-09 West 24th Place, Chicago, Ill.

MATERIALS

Bearing Metals

AMERICAN NON GRAN BRONZE CORPORATION, Berwyn, Pa.
AMPLEX MANUFACTURING COMPANY, 7900 Jos. Campau Street, Detroit.
BEARIUM METALS CORPORATION, 258 State Street, Rochester, N. Y.
BOUND BROOK OIL-LESS BEARING COMPANY, Bound Brook, N. J.
FEDERAL MOGUL CORPORATION, Detroit, Mich.
LUMEN BEARING COMPANY, 215 Lathrop Street, Buffalo, N. Y.

Cleaning Compounds

CURRAN CORPORATION, 114 Central Street, Somerville, Mass.
FISCHER'S SURFA-SAVER, INC., Cincinnati, Ohio.
MAGNUS CHEMICAL COMPANY, Garwood, N. J.
OAKITE PRODUCTS, INC., 22 Thames Street, New York City.
TURKO PRODUCTS, INC., Los Angeles.

Fabrics (Decorative)

L. C. CHASE COMPANY, 295 Fifth Avenue, New York City.
THE LAIDLAW COMPANY, 16 West 60th Street, New York City.
F. SCHUMACHER & COMPANY, 60 West 40th Street, New York City.
SHELTON LOOMS, 1 Park Avenue, New York City.

Fabrics (Wing)

SUNCOOK MILLS, George A. Sloan & Company, Inc., 34 Thomas Street, New York City.
THURSTON CUTTING CORPORATION, 40 Worth Street, New York City.
WELLINGTON SEARS COMPANY, 65 Worth Street, New York City.

Finishing

AMERICAN CHEMICAL PAINT COMPANY, Ambler, Pa.
BERRY BROTHERS, INC., Detroit, Mich.
COOK PAINT & VARNISH COMPANY, Kansas City, Mo.

E. I. DuPont de Nemours Company, Wilmington, Del.
Glidden Company, Cleveland, Ohio.
Johns-Manville, Inc., New York.
Lowe Brothers, 452 East Third Street, Dayton, Ohio.
Merrimac Chemical Company, Empire State Building, New York.
Perry Austin Manufacturing Company, Grassmere, N. Y.
Phenix Aircraft Products Company, Williamsville, N. Y.
Pittsburgh Plate Glass Company, Pittsburgh, Pa.
Pratt & Lambert, Inc., 73 Tonawanda Street, Buffalo, N. Y.
Sherwin-Williams Company, Cleveland, Ohio.
Titanine, Inc., Union, Union County, N. J.
Valentine & Company, 386 Fourth Avenue, New York City.
Wailes Dove-Hermiston Corporation, 17 Battery place, New York.

Glass, etc.

American Window Glass Company, Pittsburgh, Pa.
Du Pont Viscoloid Company, Arlington, N. J.
Libbey-Owens-Ford Glass Company, Toledo, Ohio.
Pittsburgh Plate Glass Company, Pittsburgh, Pa.

Insulating

American Felt Company, 315 Fourth Avenue, New York City.
American Hair & Felt Company, Chicago, Ill.
Booth Felt Company, Inc., 485 Eighteenth Street, Brooklyn, N. Y.
The Burgess Battery Company, 111 West Monroe Street, Chicago.
Dry-Zero Corporation, Chicago, Ill.
The Felters Company, Inc., 210 South Street, Boston, Mass.
The Johns-Manville Company, 22 East 40th Street, New York City.
Seaman Paper Company, Chicago.

Metals

Allegheny Steel Company, Brackenridge, Pa.
Aluminum Company of America, Pittsburgh, Pa.
Aluminum Industries, Inc., 2416 Beekman Street, Cincinnati, Ohio.
American Brass Company, Waterbury, Conn.
American Magnesium Corporation, Cleveland, Ohio.
American Sheet & Tin Plate Company, Frick Building, Pittsburgh.
American Steel & Wire Company, 208 South La Salle Street, Chicago.
Atlas Steel Casting Company, 1963 Elmwood Avenue, Buffalo, N. Y.
Baush Machine & Tool Company, 156 Wasen Street, Springfield, Mass.
Bethlehem Steel Company, Inc., Bethlehem, Pa.
C. F. Burgess Laboratories, Inc. (Illium), 111 West Monroe St., Chicago, Ill.
Carpenter Steel Company, Reading, Pa.
Chase Brass & Copper Company, Inc., Waterbury, Conn.
Climax Molybdenum Company, 500 Fifth Avenue, New York City.
Continental Steel Corporation, Kokomo, Ind.
Crucible Steel Company, Chrysler Building, New York City.
Dow Chemical Company, Midland, Mich.
Electro-Metallurgical Company, 30 East 42d Street, New York City.
Haynes Stellite Company, Kokomo, Ind.
International Nickel Company, 67 Wall Street, New York City.
U. S. Steel, Bethlehem, Pa.

Rubber, Synthetics, etc.

American Hard Rubber Company, 11 Mercer Street, New York City.
Bakelite Corporation, Bound Brook, N. J.
Bloxham Aero Manufacturing Company, 7541 Emerald Avenue, Chicago, Ill.
Continental Diamond Fibre Company, West Newark, Del.
E. I. Du Pont de Nemours Company, Wilmington, Del.
The Formica Insulation Company, Cincinnati, Ohio.
B. F. Goodrich Company, Akron, Ohio.
Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J.
Spalding Fibre Company, 484 Broome Street, New York City.
Thiokol Corporation, Yardville, N. J.
U. S. Rubber Products Company, 1790 Broadway, New York City.
Weatherhead Company, 632 Frankfort Avenue, Cleveland, Ohio.

Wood and Plywood

Algoma Plywood & Veneer Company, Algoma, Wis.
Amer. Hardwood Lumber Company, Los Angeles, Cal.
D. L. Auld Company, Columbus, Ohio.
Balsa Wood Corporation, 158 Pioneer Street, Brooklyn, N. Y.
Carrom Company, East Ludington Avenue, Ludington, Mich.
Cross, Austin & Ireland Lumber Company, Brooklyn, N. Y.
Haskelite Manufacturing Corporation, 208 West Washington Street, Chicago, Ill.
Met-L-Wood Corporation, Chicago.
National Aircraft Materials Corporation, Rutland, Vt.
Frank Paxton Lumber Company, Kansas City, Kan.
Posey Manufacturing Company, Hoquiam, Wash.
U. S. Plywood Company, 603 West 36th Street, New York City.
The Yoho & Hooker Lumber Company, Youngstown, Ohio.

Miscellaneous

Casein Manufacturing Company (glue), Bainbridge, N. Y.
L. W. Ferdinand & Company (glue), 152 Kneeland Street, Boston, Mass.
Raybestos Division of Raybestos-Manhattan, Inc. (brake lining), Railroad Avenue, Bridgeport, Conn.

PARTS

Bearings

Bantam Ball Bearing Company, South Bend, Ind.
The Fafnir Bearing Company, New Britain, Conn.
Marlin Rockwell Corporation, Jamestown, N. Y.
The New Departure Manufacturing Company, Bristol, Conn.
Norma-Hoffmann Bearings Corporation, Stamford, Conn.
S. K. F. Industries, Inc., Front Street and Erie Avenue, Philadelphia, Pa.
The Timken Roller Bearing Company, Canton, Ohio.

Cables (Structural)

American Steel & Wire Company, 208 South La Salle Street, Chicago.
American Cable Company, 230 Park Avenue, New York City.
Hazard Wire Rope Company, 230 Park Avenue, New York City.
John A. Roebling's Sons Company, Trenton, N. J.

Fabricated

Aerial Machine & Tool Corporation, 260 West Street, New York.
Barnes Air Service Company, Westfield, Mass.
Bendix Products Corporation, South Bend, Ind.
Bohn Aluminum & Brass Company, East Grand Boulevard, Detroit, Mich.
Boston Gear Works, Quincy, Mass.
Breeze Corporations, 24-26 South Sixth Street, Newark, N. J.
Brewster Aeronautical Corporation, Long Island City, N. Y.
Budd Manufacturing Company, Philadelphia, Pa.
Buhl Stamping Company, 2730 Scotten Avenue, Detroit, Mich.
Dayton Manufacturing Company, Dayton, Ohio.
Doehler Die Casting Company, Batavia, N. Y.
Engle Aircraft Specialties, Glendale, Cal.
Ex-Cell-O Aircraft & Tool Corporation, 1200 Oakman Boulevard, Detroit, Mich.
The Formica Insulation Company Cincinnati, Ohio.
Fleetwings, Inc., Bristol, Pa.
G & O Manufacturing Company, New Haven, Conn.
Industrial Engineering & Manufacturing Company, 239 John Street, Bridgeport, Conn.
Kirkham Engineering & Manufacturing Corporation, Farmingdale, L. I., N. Y.
Meisel Press Manufacturing Company, Dorchester Avenue, Boston, Mass.
National Steel Products, Dayton, Ohio.
United Aircraft Products, Dayton, Ohio.
Wrought Washer Manufacturing Company, 2100 South Bay Street, Milwaukee, Wis.

BENDIX

AIRPLANE WHEELS · BRAKES · PILOT SEATS AND PNEUDRAULIC SHOCK STRUTS

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High and Low Pressure "Streamline"

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Designed and Tested to Meet Individual Requirements

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WHEN 3 out of 4 of the major airlines all use the same brand of petroleum products, *you* can safely count on that particular brand.

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Nation-wide distribution facilities assure prompt delivery

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Fastening Devices

AMERICAN SCREW COMPANY, Providence, R. I.
DARDELET THREADLOCK CORPORATION, 120 Broadway, New York City.
DZUS FASTENER COMPANY, Babylon, L. I., N. Y.
ELASTIC STOP NUT CORPORATION, Elizabeth, N. J.
HARTFORD MACHINE SCREW COMPANY, 476 Capitol Avenue, Hartford, Conn.
INDUSTRIAL ENGINEERING COMPANY, 239 John Street, Bridgeport, Conn.
KELLOGG SWITCHBOARD & SUPPLY COMPANY, 1066 West Adams Street, Chicago, Ill.
MILFORD RIVET & MACHINE COMPANY, Milford, Conn.
THE PALNUT COMPANY, INC., 58 Cordier Street, Irvington, N. Y.
PARKER-KALON CORPORATION, 200 Varick Street, New York City.
SHAKEPROOF LOCK WASHER COMPANY, Chicago, Ill.
UNITED-CARR FASTENER CORPORATION, 31 Ames Street, Cambridge, Mass.
THE WROUGHT WASHER MANUFACTURING COMPANY, Milwaukee, Wis.

Fittings and Hardware

IMPERIAL BRASS MANUFACTURING COMPANY, 524 South Racine Avenue, Chicago, Ill.
LUNKENHEIMER COMPANY, Cincinnati.
THE PARKER APPLIANCE COMPANY, 17325 Euclid Avenue, Cleveland.
STEWART-WARNER CORPORATION, Alemite Division, Chicago, Ill.

Forgings

ATLAS DROP FORGE COMPANY, Lansing, Mich.
BILLINGS & SPENCER, Hartford, Conn.
CANTON DROP FORGING & MANUFACTURING COMPANY, Canton, Ohio.
ENDICOTT FORGING & MANUFACTURING COMPANY, Endicott, N. Y.
FARREL-BIRMINGHAM COMPANY, Ansonia, Conn.
THE FITZGERALD MANUFACTURING COMPANY, Torrington, Conn.
GOVRO-NELSON COMPANY, Detroit.
PARK DROP FORGE COMPANY, 730 East Seventy-ninth Street, Cleveland.
UNION DRAWN STEEL COMPANY, Beaver Falls, Pa.
UNION SWITCH & SIGNAL COMPANY, Swissvale, Pa.
J. H. WILLIAMS & COMPANY, 75 Spring Street, New York City.
WYMAN-GORDON COMPANY, Worcester, Mass.

Gaskets

DETROIT GASKET & MANUFACTURING COMPANY, 1579 East Milwaukee Avenue, Detroit.
THE FITZGERALD MANUFACTURING COMPANY, Torrington, Conn.
THE GARLOCK PACKING COMPANY, Palmyra, N. Y.
GOETZE GASKET & PACKING COMPANY, INC., New Brunswick, N. J.
RAYBESTOS DIVISION RAYBESTOS-MANHATTAN, INC., Bridgeport, Conn.
THE VELLUMOID COMPANY, 54 Rockdale Street, Worcester, Mass.
VICTOR MANUFACTURING & GASKET COMPANY, 5750 Roosevelt Road, Chicago, Ill.

Shock Washers

GARLOCK PACKING COMPANY, Palmyra, N. Y.
LORD MANUFACTURING COMPANY, Erie, Pa.

Springs

THE WALLACE BARNES COMPANY, Bristol, Conn.
RAYMOND MANUFACTURING COMPANY, Corry, Pa.
AIRPLANE SPRING COMPANY, 30 Main Street, Brooklyn, N. Y.

Tie Rods

BREEZE CORPORATIONS, INC., 24 South Sixth Street, Newark, N. J.
STEWART HARTSHORN COMPANY, 250 Fifth Avenue, New York City.
MACWHYTE COMPANY, Kenosha, Wis.

Tubing (Flexible)

AMERICAN METAL HOSE DIVISION, AMERICAN BRASS COMPANY, Waterbury, Conn.
BREEZE CORPORATIONS, INC., 24 South Sixth Street, Newark, N. J.
CHICAGO TUBING & BRAIDING COMPANY, 310 North Clinton Street, Chicago, Ill.
ECLIPSE AVIATION CORPORATION, 545 North Arlington Avenue, East Orange, N. J.
PENNSYLVANIA FLEXIBLE METALLIC TUBING COMPANY, 7215 Powers Lane, Philadelphia, Pa.
TITEFLEX METAL HOSE COMPANY, 500 Frelinghuysen Avenue, Newark, N. J.
SEAMLEX COMPANY, 5-19 48th Avenue, Long Island City, N. Y.
UNITED METAL HOSE COMPANY, 734 Garrison Avenue, New York City.

Tubing (Non-Ferrous)

AMERICAN BRASS COMPANY, 414 Meadow Street, Waterbury, Conn.
CHASE BRASS & COPPER COMPANY, 236 Grand Street, Waterbury, Conn.
ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa.
DUCOMMON CORPORATION, Los Angeles, Cal.

Tubing (Steel)

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
OHIO SEAMLESS TUBING COMPANY, Shelby, Ohio.
SERVICE STEEL COMPANY, 1435 Franklin Street, Detroit, Mich.
SUMMERILL TUBING COMPANY, Bridgeport, Pa.

SHOP EQUIPMENT

AIR REDUCTION SALES COMPANY (welding equipment), 60 East 42d Street, New York City.
ALBERTSON & COMPANY, 3100 Loweil Avenue, Sioux City, Iowa.
AVON TOOL & MACHINE COMPANY, Dayton, Ohio.
BINKS MANUFACTURING COMPANY (paint spray), 3114 Carroll Avenue, Chicago, Ill.
BLACK & DECKER MANUFACTURING COMPANY (portable electric tools), Towson, Md.
THE BRUNNER MANUFACTURING COMPANY (air compressors), Utica, N. Y.
CHICAGO PNEUMATIC TOOL COMPANY, 6 East 44th Street, New York City.
DE VILBISS COMPANY (paint spray equipment), Toledo, Ohio.
ENGINEERING & RESEARCH CORPORATION (forming machinery), Washington, D. C.
HEALD MACHINE COMPANY (grinders), Worcester, Mass.
HOMESTEAD VALVE MANUFACTURING COMPANY (hypressure jenny), P. O. Box H, Coraopolis, Pa.
INDEPENDENT PNEUMATIC TOOL COMPANY (portable power tools), 600 West Jackson Boulevard, Chicago.
LINDE AIR PRODUCTS COMPANY (welding equipment), 205 East 42d Street, New York City.
THE ALEXANDER MILBURN COMPANY (welding equipment), 1416 West Baltimore Street, Baltimore, Md.
PAASCHE AIR BRUSH COMPANY (paint spray), Chicago, Ill.
A. SCHRADER'S SON, INC. (compressed air equipment), Brooklyn, N. Y.
SKILSAW INC. (small power tools), 3310 Elston Avenue, Chicago, Ill.
SMITH WELDING EQUIPMENT CORPORATION, 2633 Fourth Street Southeast, Minneapolis, Minn.
THE STANLEY WORKS (small tools), Lake Street, New Britain, Conn.
L. S. STARRETT COMPANY, Athol, Mass.
UNION CARBIDE & CARBON CORPORATION (welding supplies), 30 East 42d Street, New York City.
UNITED STATES ELECTRICAL TOOL COMPANY, 2463 West Sixth Street, Cincinnati, Ohio.
VAN DORN ELECTRIC TOOL COMPANY, Towson, Md.
WORTHINGTON PUMP & MACHINERY CORPORATION (air compressors), Harrison, N. J.

MISCELLANEOUS

AMERICAN OPTICAL COMPANY (goggles), Southbridge, Mass.
J. V. W. CORPORATION (link trainer), 534 Broad Street, Newark, N. J.
E. B. MEYROWITZ, INC. (goggles), 520 Fifth Avenue, New York City.
WEEMS SYSTEM OF NAVIGATION, Annapolis, Md.

DISTRIBUTORS

AIR ASSOCIATES, INC., Garden City, N. Y.; Chicago, Ill.; Glendale, Cal.
AERO SUPPLY CORPORATION, Corry, Pa.
AIR TRANSPORT EQUIPMENT, INC., Garden City, N. Y.
BREDOUW-HILLIARD AEROMOTIVE COMPANY, Kansas City, Mo.
JOHNSON AIRPLANE & SUPPLY, Vandalia, Ohio.
NICHOLAS-BEAZLEY AIRPLANE COMPANY, INC., Marshall, Mo.
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PACIFIC AIRMOTIVE CORPORATION, LTD., Union Air Terminal, Burbank, Cal.
PACIFIC SCIENTIFIC INSTRUMENT COMPANY, Los Angeles, Cal.

The NEW DST
powered by WRIGHT CYCLONES

Wright Cyclones have been selected to power American Airlines' fleet of giant, new Douglas Sleeper Transports. This announcement is the most important commercial aircraft engine news since the decision, two years ago, to equip the first Douglas transports with Wright Cyclones.

The Cyclone-powered Douglas is now internationally famous. Today 110 giant airliners of the DC-2 type are in operation on leading airlines in 21 countries throughout the world. They fly 75,000 miles daily—three times the circumference of the Earth at the Equator. And it is estimated that to date Cyclone-powered Douglas transports have flown the imposing total of 23,000,000 miles.

American Airlines' giant, new Douglas Sleeper Transports are royally appointed for night and day travel. The spacious cabin provides large, private sleeping compartments for 16, with day accommodations for 24—and furnishes all of the conveniences of a deluxe transcontinental train. American Airlines will soon place these luxurious transports in transcontinental service—providing direct overnight sleeper service from New York to California.

The new 1000 horsepower Wright Cyclones which have been selected to power the Douglas DST Transports are the same type as the engine which recently enabled Howard Hughes to establish a new transcontinental speed record in the phenomenal time of 9 hours and 25 minutes. The remarkably low fuel consumption of this engine supplements the low maintenance costs and reliability of the Wright Cyclone—established by 100,000,000 miles of airline operating experience.

WRIGHT
AERONAUTICAL CORPORATION
PATERSON NEW JERSEY

A DIVISION OF CURTISS-WRIGHT CORPORATION

PLANTS, PRODUCTS, and PEOPLE

ACCESSORIES

A.C. Spark Plug Company

PRINCIPAL PRODUCTS, spark plugs for aircraft engines.

Personnel: F. S. Kimmerling, president; T. G. McDougal, vice-president; Eskild Bondesen, controller; T. S. Merrill, secretary; W. S. Isherwood, sales manager; C. W. McKinley, chief engineer.

Aero Service Corporation

THE MAIN FUNCTION of this company is aerial photography, but through an associated company it also is engaged in the manufacture of aerial cameras, stereoscopes and mechanical developing and drying equipment for aerial photographic film.

Personnel: Virgil Kauffman, president; Henry C. Gibson, vice-president; Mary K. Gibson, secretary and treasurer; John H. Witherow, sales manager; Henry W. Dotzenroth, chief engineer.

Air Associates

BESIDES functioning as a dealer of all classes of aeronautical supplies and materials, this company manufactures the following items: bolts and nuts, aviation hardware, spark plug shields, magneto shielding and harness, wind-driven sirens, wind cones, rotating beacons wind-driven generators, interference filters and radio accessories, battery booster coils, propeller brakes, hydraulic control equipment, flap and landing gear operating mechanisms, aircraft instruments, clothing, helmets, pilots' equipment, navigating equipment.

Personnel: F. L. Hill, president; H. B. Page, vice-president; H. I. Crow, secretary-treasurer.

Air-Maze Corporation

PRODUCTS: cleaner for carburetor intake air.

Personnel: Albert E. Schaaf, president, George M. Walton, vice-president; Hubert H. Schaaf, treasurer; Lillian M. Henton, secretary; Walter G. Heacock, sales manager; George M. Walton, chief engineer.

Allegheny Steel Company

THIS COMPANY does not manufacture any finished items for the aircraft industry, but furnishes stainless steel in sheet, bar, strip and wire forms.

Personnel: H. E. Sheldon, president; W. F. Detweiler, vice-president and general manager; F. H. Stephens, secretary and treasurer; W. J. McArdle, sales manager; J. R. Taylor, chief engineer.

Allith-Prouty Manufacturing Company

MANUFACTURED products are confined to hardware for handling of hangar doors at airports. These doors are of the sliding type, roller mounted, running on steel rail tracks.

Personnel: M. D. Barker, president; A. H. Lubin, vice-president; Paul Barker, secretary and treasurer; N. B. Hart, sales manager; R. B. Older, general manager.

Aluminum Company of America

PRODUCER of a wide range of the basic materials for the aircraft industry. Light alloys available in all forms, including casting ingot, forgings, sheet, tube, wire, rod, bar, etc. Beside raw materials, manufactures to specification finished castings, forgings of all types, and also many fabricated parts such as tanks, fittings, tube assemblies, etc. Engineering data available on all fabricating problems.

Aluminum Industries, Inc.

CHIEF PRODUCTS for aircraft engines: Aluminum alloy pistons, piston pins, diachrome valves, torque pins, aluminum alloy connecting rods.

Personnel: John Eckerle, president; J. P. Andrae, vice-president; H. J. Hater, treasurer and vice-president; R. T. Mesker, secretary; Donald McDonald, sales manager; M. A. Beckmann, chief engineer.

American Airport Equipment

WIND CONES, lighted and unlighted, boundary markers and boundary lights and obstruction lights, are the principal products. The complete line of masts marker flags and miscellaneous hardware for airport markings is also carried.

Personnel: George F. Kelly, president.

American Brass Company

PRINCIPAL PRODUCT for the aviation industry is a new beryllium copper alloy which has application to aircraft parts. This alloy has been used for parts in Fairchild aerial cameras; non-sparking, non-magnetic tools for Stanley Company; gears for retractable landing equipment on Martin bombers; hub cones for Hamilton Standard controllable pitch propellers; and for springs for various aircraft applications. In addition, the company supplies Everdur, a metal especially suited for fuel and oil lines and for gasoline tanks.

Personnel: John A. Coe, president; C. F. Hollister, vice-president and secretary; C. S. Judd, vice-president of manufacture; F. E. Weaver, vice-president in charge of sales.

American Hammered Piston Ring Company

MANUFACTURES piston rings for all types of aviation engines, including original equipment for Pratt & Whitney, Wright, Kinner, etc.

Personnel: Allen W. Morton, vice-president in charge; John A. Worthington, sales manager.

American LaFrance and Foamite Industries, Inc.

MANUFACTURES fire-fighting equipment for airport use including Foamite 10, 20, and 40-gal. engines, Foamite foam generators, Foamite 2½-gal. extinguishers, Alfite (carbon dioxide) extinguishers, and completely equipped crash trucks.

Personnel: C. B. Rose, president; W. J. Childs vice-president; O. M. Canter, secretary and treasurer; A. G. Sullivan and E. E. O'Neil, sales managers; Hugh Walker, chief engineer.

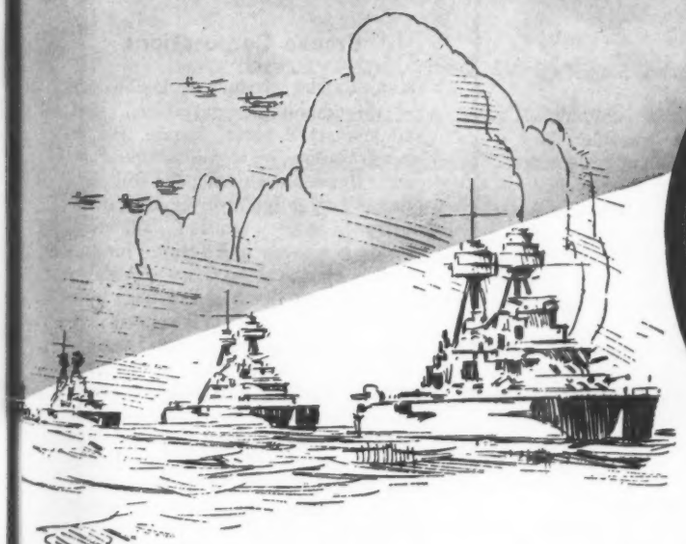
American Tube Bending Company, Inc.

MANUFACTURE aircraft engine parts, such as intake pipes, exhaust collectors, exhaust stacks, radio shielded cable, tubes, oil lines, etc. For airplane use, supplies control sticks, tail skids, landing gear parts and engine mounting rings.

Personnel: R. H. Wulf, president; N. C. Wellman, vice-president; R. H. Wulf, treasurer; E. L. Wulf, secretary; J. L. Umsteadt, chief engineer.

"The EYES of the FLEET"

Official Photograph U. S. Na



Curtiss SOC-1

STANDARD U.S. NAVY SCOUT-OBSERVATION PLANE

The Curtiss SOC-1 is the new, standard Scout Observation plane of the United States Navy. Deliveries are now being made to the Navy Department on a production order for 135 planes of this type.

The Curtiss SOC-1 type airplane has been designed to meet the exacting requirements of scouting and observation for the battleships and cruisers of the United States Navy. It is of rugged construction and incorporates features to provide low landing speed, unusually good control and the maximum of safety to its crew when operating under adverse conditions at sea.

The cockpit enclosures, of advanced design, provide a new degree of vision and comfort for the crew, thereby increasing the airplane's efficiency in carrying out its important function as "Eyes of the Fleet." Conversion to a land plane is provided by the Curtiss single-strut type landing gear for training operations ashore.

CURTISS AEROPLANE & MOTOR COMPANY, Inc

BUFFALO — A Division of Curtiss-Wright Corporation — NEW YORK

Arens Control

ONLY PRODUCT of this company is a push-pull type of control unit for choke, starter, throttle and spark control for aircraft. Made in three sizes, $\frac{3}{8}$ in., $\frac{7}{16}$ in. and $\frac{1}{2}$ in. Parts are rustproof, sliding elements factory lubricated.

Personnel: Charles A. Arens, president.

Atlas Drop Forge Company

REGULAR articles of manufacture cover every type of forging, including crankshafts, camshaft and rocker arms as well as gears; landing gear forgings; wing spar forgings and spar splices; propeller mountings and fuselage hardware.

Personnel: R. H. Scott, president; E. W. Goodnow, vice-president and general manager; O. C. Hartig, plant manager; N. R. Buckingham, chief engineer; John Harding, metallurgist; E. L. Oberly, manufacturing superintendent.

The Bantam Ball Bearing Company

MANUFACTURES a complete line of ball radial, ball thrust, roller radial, with roller thrust, journal taper and quill bearings. The latter are of particular interest to the aviation industry as they permit carrying heavy loads in very small overall diameters.

A subsidiary of the Torrington Company.

Barnes Air Service Company

PRINCIPAL PRODUCT is the O'Connor adjustable space washer for installation in rocker-arm bearings of Lycoming, Wright and other aircraft engines.

Personnel: Charles P. O'Connor, president.

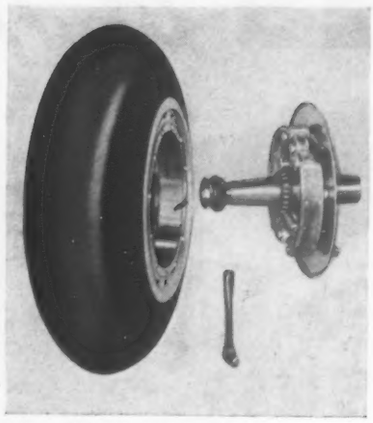
Bearium Metals Corporation

THE SOLE product of this company is bearium metal, a highly leaded bronze of unusual strength and with desirable frictional properties, useful as a bearing material.

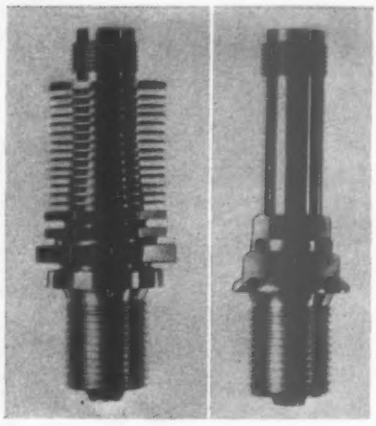
Personnel: E. P. Langworthy, president; H. M. Rees, vice-president; B. M. Garek, sales manager.

Bendix Products Corporation

THIS COMPANY is a subsidiary of Bendix Aviation Corp. Its chief products are: streamline wheel and brake combination (tire pressures from 25 to 50 lb. per sq.in.); pneudraulic shock struts (manufactured to meet individual requirements of specific airplanes); tail wheel assembly (with single fork knuckle, swivelable through 360 deg. and also steerable in the smaller sizes); low pressure transport wheels (equipped with quick demountable tire flanges and with dual brakes); pilot seat (to meet military requirements, weight $6\frac{3}{4}$ lb.).



Bendix wheel and brake.



B. G. shielded spark plugs.

Personnel: Vincent Bendix, president; Walter J. Buettner, treasurer; Henry Gossner, secretary; John R. Cautley, sales manager, airplane wheel and brake division.

Berry Brothers

MARKETS FINISHES for every part of an airplane structure. Included are all colors of paints, lacquers, and enamels, also zinc chromate and other primers, as well as cleaning and polishing material suitable for use on all types of finishes.

Personnel: J. B. Bond, executive vice-president and general manager; T. B. Colby, vice-president; F. L. Colby, Jr., secretary and treasurer; T. B. Colby, aviation sales manager; H. L. Acker, aviation chemist.

B. G. Corporation

SPECIALIZES IN the manufacture of aeronautical spark plugs. Plugs are mica insulated, are furnished both in shielded and in unshielded patterns. During the past year a new series of plugs has been designed for high output engines, some of which are distinguishable from having cooling fins machined on the shell. Terminals and insulating sleeves, as well as spark plug maintenance equipment are also available.

Personnel: Richard Goldsmith, president; Lawrence L. Goldsmith, vice-president; Thomas S. Mack, secretary; Ray W. Leedom, sales manager; George M. Paulson, chief engineer.

S. F. Bowser & Company, Inc.

BOWSER products are used for the handling and measuring of fuel on the ground and in the air. Complete airport fueling systems both of the pit and the tank truck type available. For aircraft use, a special Xacto meter has been developed. Strainers, filters and other fuel handling hardware available.

Personnel: S. B. Bechtel, president; H. J. Grosvenor, vice-president; E. D. Eggimann, secretary and treasurer; E. C. Marsh, sales manager; C. P. Griffith, chief engineer.

Breeze Corporations

BASIC BREEZE product is flexible tubing in aluminum, galvanized steel, stainless steel, brass, bronze, etc., in sizes from 1 in. up to 6 in. inside diameter. Besides the tubing the following products are offered to the aircraft industry: radio ignition shielding; shielding conduit and fittings for secondary electrical systems; Aeroflex fuel and oil lines and fittings; tierods; ammunition rounds counter; elevator tab controls; flexible shafting and casing; tachometer drives; fuel pump drives, etc. In addition to the above, Breeze is now manufacturing stainless steel aircraft structures, stainless steel and other metal alloy fuel and oil tanks and certain new radio products including a direction finder.

Personnel: J. J. Mascuch, president; A. L. Johnston, Jr., vice-president; J. T. Mascuch, secretary and treasurer; J. F. Lucas, sales manager; F. G. Gardner, chief engineer.

Brewster Aeronautical Corporation

INCLUDED in this company's products are: stainless steel exhaust manifolds; aluminum alloy cowling, tanks, miscel-

Unequalled Resources Produce

The Most Advanced Design—

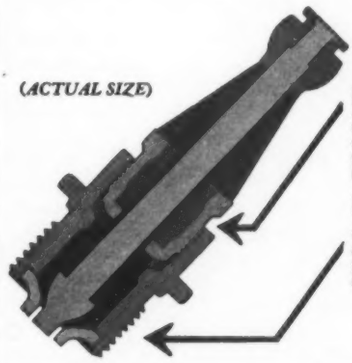
CHAMPION

Aircraft Spark Plugs

The new Champion mica aircraft spark plugs embody elements of advanced design and manufacture which could be produced only by a manufacturer with Champion's unequalled resources and experience.

Specifically designed to give better, more dependable performance in every aircraft engine, Champion Aircraft Spark Plugs set new standards in the most exacting service. Whatever ignition problems you may have, you can rest assured that Champion Aircraft Spark Plugs are designed to meet them.

The reputation and experience of the maker should be a vital factor in determining your choice of aircraft spark plugs. The new Champions are already used by several leading plane and engine manufacturers and by the U. S. Army Air Corps.



NEW METHOD OF SEALING CORE by simultaneous application of enormous heat and pressure, bonds core to shell, guaranteeing gas tightness for life of plug.

NEW DESIGN ELECTRODE AND GAP SHAPE with large area of parallel sparking surfaces increases plug life and means less frequent gap setting.

CHOOSE THE SPARK PLUGS CHAMPIONS USE

CHAMPION

AIRCRAFT SPARK PLUGS

laneous parts, etc.; aluminum alloy and stainless steel seaplane floats; aluminum alloy wing structures and tail surfaces.

Personnel: James Work, president; R. M. Singer and R. D. Work, Jr., vice-presidents; John R. Hunt, secretary and treasurer; James Work, sales manager; D. T. Brown, chief engineer.

Buhl Stamping Company

AMONG fabricated aircraft parts produced are: stainless steel exhaust manifolds, air ducts, carburetor feeder pipes, nose cowl assemblies, cowl rings.

Personnel: L. D. Buhl, president; H. S. Finkenstaedt, vice-president; H. E. Ryan, treasurer; T. D. Buhl, secretary; J. M. Breen, sales manager; N. F. McCarthy, chief engineer.

C. F. Burgess Laboratories, Inc.

OUT of a wide range of products, the following are of interest to the aeronautical industries: Illium, a non-corrosive metal alloy; accoustical materials (insulating) and treatment for soundproofing aircraft; dry batteries for radio use; micro switches and electronic devices for electrical circuits.

Personnel: George Burgess, president; B. S. Reynolds, vice-president; D. J. Teare, secretary and treasurer; E. A. Sipp, sales manager; R. F. Norris, chief engineer.

Caterpillar Tractor Company

CATERPILLAR tractors and graders find many uses in the construction and maintenance of airports. Also a number of power units sold by this company are used in direct connected generator sets to supply current for field lights, radio communications, etc.

Champion Spark Plug Company

MANUFACTURES both mica and ceramic aircraft spark plugs. Plain and radio shielded plugs are available.

Personnel: R. A. Stranahan, president; F. D. Stranahan, vice-president and treasurer; H. B. Speyer, secretary; R. H. Rowland, sales manager; O. C. Rohde, chief engineer.

Chase Brass & Copper Company

THIS COMPANY furnishes many types of brasses, bronzes and other non-ferrous alloys in forms suitable to a number of aeronautic applications.

A subsidiary of Kennecott Copper Corporation.

Cleveland Pneumatic Tool Company

SPECIALISTS in manufacture of oleo-pneumatic, oleo spring and straight pneumatic types of landing gear shock struts. Present line includes the Aerol and Gruss struts suitable for aircraft of all weights from the lightest planes up to the heaviest transport or military craft.

Personnel: L. W. Greve, president; H. Foster, vice-president; J. DeMooey, treasurer; A. Barner, secretary; F. H. Burr, sales manager; J. F. Wallace, chief engineer.

Climax Molybdenum Company

CHROME-MOLYBDENUM alloys find many uses in highly stressed parts on aircraft. This company furnishes one of the basic alloys for the production of these materials.

C-O-Two Fire Equipment Company

THIS concern specializes in the manufacture of automatic and manual carbon dioxide fire extinguishing systems for general plant protection. Hangar and airport systems are available.

Personnel: S. E. Allen, president; M. A. Laswell, vice-president; E. A. Clapp, secretary and treasurer.

Consolidated-Ashcroft-Hancock Company, Inc.

THE AMERICAN line of airplane instruments includes: triple service engine unit (combined oil temperature, oil pressure and fuel pressure gage); free air strut thermometer (for ice warning); dial type thermometer; fuel pressure gage.

Personnel: R. R. Wason, president; W. P. Bradbury, vice-president in charge of sales; F. M. Kreiner, secretary and treasurer; E. F. Nordstrom, sales manager, instrument division; E. H. Hammond, chief engineer, instrument division.

Crouse-Hinds

SPECIALISTS in the lighting of large areas, this company offers all types of equipment for airport lighting.

The Cuno Engineering Corporation

CUNO self-cleaning filters are standard equipment on many aircraft engines and are adaptable as alternate equipment to many others. Filters operate on the edge filtration principle and are self-cleaning without stopping the engine or shutting off oil flow.

Personnel: C. H. Cuno, president; W. A. Barnhart, treasurer; I. I. Hance, sales manager; S. L. Wolfson, chief engineer.

Curtiss Aeroplane & Motor Company, Inc.

ALTHOUGH primarily an aircraft manufacturer, this company offers the Curtiss electrically operated controllable pitch propeller. Three models available in diameters up to 12 ft. maximum to absorb up to 750-770 hp. Blade pitch controlled by electric motor in the hub. Blade full-feathering.

Personnel: B. S. Wright, vice-president; J. A. B. Smith and T. P. Wright, vice-presidents; G. S. Lapp, treasurer; E. S. Cramer, secretary; J. A. Williams, sales executive.

Cyclone Fence Company

CYCLONE fencing (wire), gates and fencing hardware are widely used for airport enclosures.

Personnel: C. F. Blackmer, president; R. C. Markle, vice-president; W. F. Kirkham, treasurer; A. F. Allen, secretary; R. E. Pinniger, sales manager; J. V. Morrissey, general superintendent.

Dardelet Threadlock Corporation

FASTENING DEVICES (bolts and nuts, etc.) with the Dardelet self-locking screw thread, are available for all types of aircraft fittings.

Personnel: A. F. Hebard, president; W. R. Davis, vice-president; M. W. Blackmar, treasurer; C. J. Gass, secretary.

Eastman Kodak Company

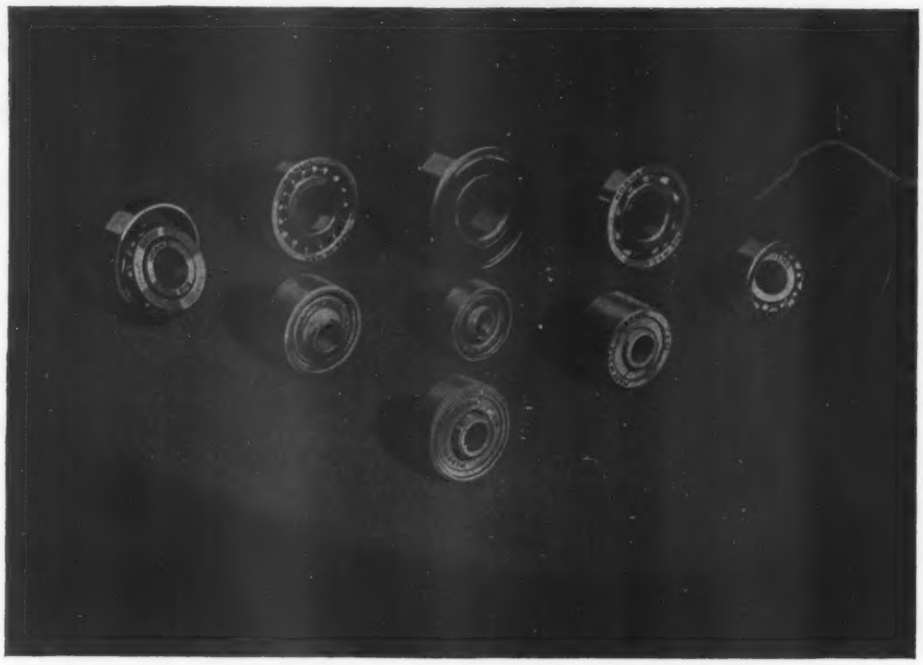
EASTMAN'S PRODUCT particularly adaptable for aviation use is special photographic film.

Personnel: F. W. Lovejoy, president; T. J. Hargrave, C. F. Ames, A. F. Sulzer, vice-presidents; M. B. Folsom, treasurer; T. J. Hargrave, secretary.

Eclipse Aviation Corporation

THIS SUBSIDIARY of Bendix Aviation Corporation, manufactures the following aircraft accessories: inertia starters, direct cranking electric starters, hand turning gears, air injection starters, starter accessory devices, single-voltage generators, double-voltage radio generators, aircraft radio dynamotors, air pumps, de-icer equipment, automatic variable pitch propel-

PRECISION BEARINGS



FOR AIRCRAFT CONTROLS

A pioneer experience of a quarter-century is reflected in the manufacture of the PRECISION Aircraft Control Bearings pictured above. During the World War, and in the years since, NORMA-HOFFMANN PRECISION Bearings have been an important factor in aircraft construction, in many vital applications. In practically every history-making flight, NORMA-HOFFMANN Bearings have participated—in planes, engines, controls, instruments or accessories.

The first high-grade ball bearing control pulleys were equipped with these NORMA-HOFFMANN PRECISION Bearings. And NORMA-HOFFMANN engineers, still pioneering, have developed many of the distinctive bearing types now accepted in aviation practice. Today almost every representative manufacturer of aircraft and equipment—including the U. S. Government—is a user of NORMA-HOFFMANN PRECISION Bearings.

The NORMA-HOFFMANN line of 108 distinct series includes—besides control bearings—PRECISION Ball, Roller and Thrust Bearings for practically every aviation requirement. Write for the Catalog, and the booklet "Precision Bearings for Aircraft Controls." Let our engineers work with you.

"NORMA-HOFFMANN"

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U. S. A.

PRECISION BALL, ROLLER, AND THRUST BEARINGS

ler hub, electric motors for retractable landing gear, fuel flowmeters, engine synchronizers, flexible metallic tubing, auxiliary gasoline engine power equipment, hydraulic remote control.

Personnel: Charles Marcus, president; R. P. Lansing, vice-president; W. J. Buettner, treasurer; H. A. Gossner, secretary; A. E. Raabe, sales manager; R. P. Lansing, chief engineer.

Edo Aircraft Corporation

EDO has seaplane conversion equipment available for practically every type of airplane (commercial and military) in production. Basic design is for twin float installation. Floats are of all-metal construction, retracting water rudders are standard equipment. Available in ten models, for ships ranging in gross weight from 1,125 lb. to 6,560 lb. Special floats for larger ships (Ford, Condor, etc.) available on order.

Personnel: E. D. Osborn, president; G. B. Post, vice-president; K. D. Vosler, treasurer; G. B. Post, sales manager; B. V. Korvin-Kroukovsky, chief engineer.

Elastic Stop Nut Corporation

SELF-LOCKING elastic stop nuts made from steel, brass and aluminum in all types including hex, anchor, clinch, instrument mounting, right-angle, gang channel, etc. Available also is a newly developed flush type cowl fastener.

Personnel: A. Swanstrom, president; H. B. Thomas, vice-president.

Engle Aircraft Specialties

MANUFACTURER of cowling, nose ring, and exhaust manifold. Specialists in all types of metal forming by drop hammer, power hammer, or spinning.

Ex-Cell-O Aircraft & Tool Corporation

THIS COMPANY manufactures precision parts for aircraft and aircraft engine builders. Parts are available in practically any material to purchasers' specifications.

Personnel: N. A. Woodworth, president; Philip Huber, vice-president; W. F. Wise, sales manager; I. J. Snader, chief engineer.

Fafnir Bearing Company

FAFNIR aircraft type bearings are designed particularly for aeronautical use. The line includes the F1K double felt seal cartridge type, the K series double metal seal type, the KC series areo-seal type, the KF series

Eclipse starter.

double metal seal self-aligning type and the A540 series torque tube type. These bearings are specially light weight, compact and corrosion resistant.

Personnel: Morris Stanley, president; C. F. Stanley, vice-president and sales manager; A. G. Way, treasurer; S. M. Cooper, secretary; E. R. Carter, chief engineer; D. L. Holbrook, aircraft sales engineer.

Fairchild Aerial Camera Corporation

OFFERS sixteen separate types of aerial photograph equipment, including hand and machine mounted automatic and semi-automatic cameras for various purposes, both military and commercial. Recent specialty is multi-lens equipment including 5, 9 and 10 lens mapping cameras. A machine-gun type camera is available for combat practice. Photographic accessories available include: portable flight photographic laboratory, copying cameras, ratio cameras, large contact printers, vertical view finders, light filters, stereoscopes. Latest addition to the Fairchild line is the Kruesi radio compass, Hagner position finder, and other instruments.

Personnel: J. S. Ogsbury, president; F. W. Lutz, vice-president; W. H. Schwebel, secretary-treasurer; J. P. Gaty, sales manager; G. R. Rattray, chief engineer.

Federal Aircraft Works

PRODUCT of this company is ski equipment for aircraft. Skis are of lightweight construction of wood and metal, are adaptable for attachment to landing gears of many types of airplane.

Personnel: F. J. Ditter, A. A. Bursch, owners.

The Fitzgerald Manufacturing Company

MANUFACTURERS of gaskets of practically all types, gasket materials.

Personnel: P. J. Fitzgerald, president; M. D. Fitzgerald, vice-president; M. F. Fitzgerald, treasurer; B. G. Peck, secretary and sales manager

Fleetwings, Inc.

SPECIALISTS in stainless steel construction for aircraft. Products include complete aircraft, also a wide range of parts including complete wings, tail surfaces, ribs and spars, fuel tanks, etc.

Personnel: Carl DeGanahl, president; G. S. Ireland, vice-president; A. M. Carlson, secretary and treasurer; W. L. Sutton, chief engineer.

Formica Insulation Company

PLAIN BEARING, roller and ball bearing control pulleys, fairleads and other radio insulators, and the Formica composition panels for cabin linings, constitute the products of this company.

Personnel: D. J. O'Conor, president; W. G. Steiner, sales manager; R. W. Lytle, chief engineer.

G. & O. Manufacturing Company

PRODUCTS include oil coolers, nose cowlings, and engine cooling radiators for the aviation industry.

Personnel: A. J. Verdi, president; Vincent Carangelo, vice-president; Charles Oppe, treasurer; F. I. Newton, secretary.

Garlock Packing Company

PRODUCTS are water pump and fuel pump packings; gaskets of asbestos, fiber or rubber, cut to any shape; oil seal rings of rubber for crankcases; dust sleeves for pushrod assemblies, hose of all types; gommets; shock absorber packing; vibration dampers.

Personnel: G. L. Abbott, president; Philip Arnold, vice-president in charge of sales; R. M. Waples, secretary.

General Cable Corporation

MANUFACTURER of the following: cable accessories (junction boxes, terminal splicers, etc.); parkway cable (metallic armored underground cable) portable cords (synthetic rubber jacketed); rubber-covered wires; trench-lay cable (non-metallic armored underground cable); welding cable. In addition to these aircraft cables, the

Announcing the

JACOBS L5 285 H. P. ENGINE

Rated: 285 H. P. at 2000 R. P. M.
Weight: 460 pounds.
Overall Diameter: 43½ inches
Gas Consumption: 15 to 17 gallons per hour.

The Model L5 is based on the proven engineering of the Jacobs L4 225 H. P. engines, whose recognized efficiency has also been increased for 1936 through progressive refinements in design and construction.

JACOBS AIRCRAFT ENGINE CO.

POTTSTOWN, PENNSYLVANIA

company offered for aircraft use landing light cables, shielded and unshielded ignition cables, shielded and unshielded lighting cables, molded ignition manifolds, radio antenna wire.

Personnel: D. R. G. Palmer, president; R. W. Straus, C. R. Myer, F. M. Potter, W. L. Trammell, vice-presidents; P. D. Rensenhouse, treasurer; W. C. Hall, secretary.

General Electric Company

THE AERONAUTIC products of this company include complete airport and airway lighting equipment including beacons, floodlights, etc. Also superchargers for aircraft engines.

General Tire & Rubber Company

PRINCIPAL aeronautic product has been the so-called streamline tire available for all sizes of aircraft for tail wheel and for main landing wheels. As a parallel development, complete wheel and brake equipment for streamline tires is offered.

Personnel: W. O'Neil, president; C. J. Jalant, vice-president; Ray Brown, aviation sales manager.

Goetze Gasket & Packing Company

AMONG the products are various metallic, semi-metallic and soft gaskets.

Personnel: F. Goetze, president; K. McCreary, treasurer; A. Kotzbach, secretary.

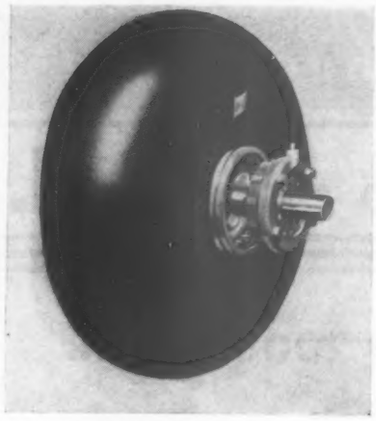
B. F. Goodrich Company

BESIDE producing a full line of tires for aircraft use, Goodrich has specialized in the development of de-icing equipment. Goodrich wing and tail surface de-icers (pneumatically operated), also abrasion shoes, are widely used on transport planes in the United States. One of the most important contributions recently has been the development of a mechanical fastening device to replace the older system of cementing de-icer overshoes to aircraft wings.

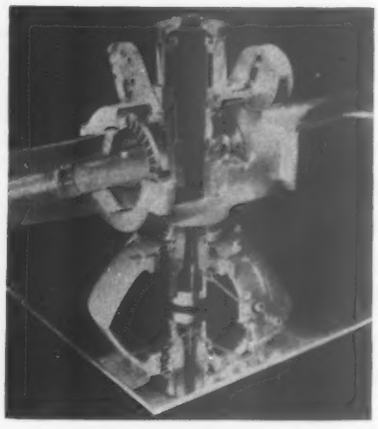
Personnel: J. D. Tew, president; S. B. Robertson, J. H. Connors, J. J. Newman, T. G. Graham, vice-presidents; V. I. Montenyohl, treasurer; S. M. Jett, secretary; H. E. Cook, chief engineer; C. B. O'Connor, sales manager.

Goodyear Tire & Rubber Company

PRODUCTS include a complete line of tires, tubes, brakes and wheels for all kinds of aircraft. Tires and tubes are in four different types including high pressure, streamline, intermediate and full low-pressure airwheel. Each type is available in sizes from the smallest tail wheel to the largest main landing wheel. Wheels and brakes are made only for intermediate and airwheel types. Brakes are of the multiple-disk clutch type mechanically, hydraulically or pneumatically operated.



Goodyear Airwheel.



Hamilton Standard controllable propeller.

Personnel: Paul Litchfield, president; L. O. Guinther, manager, airplane division.

Gould Storage Battery

OF INTEREST to the aviation industry is the newest Gould battery, the so-caller armored Kathanode type. Available in 6 or 12-volt units, in standard aircraft size cases with ratings (on a 5-hour basis) from 10 to 65 amp.-hr.

Personnel: L. J. Shields, president; G. P. Castner, vice-president; J. L. Rupp, vice-president and general manager; E. F. Carey, treasurer; E. H. Church, secretary; J. C. Sykora, assistant sales manager.

Graflex

MAKERS of high-speed precision camera equipment.

A division of Eastman Kodak Company.

Grimes Manufacturing Company

IN ADDITION to the complete line of position lights, arranged for wing-tip or wing-edge mounting, this company manufactures a self-contained retractable landing light, designed to be installed completely inside wing, electric motor operated, 315 candlepower for 12-volt operation. Unit weighs 3¼ lb. complete and will open against 250 m.p.h. speed.

Personnel: W. G. Grimes, president and owner.

Hamilton Standard Propellers

HAMILTON STANDARD adjustable type propellers (aluminum alloy blades, steel hubs), are available in two and three-blade styles in diameters from 7 to 13 ft. for engines of horsepower ranging from 60 to approximately 1,000 hp.

The two-position hydraulic type controllable pitch propeller now standard on many airlines in this country and abroad, is available in both two and three-blade types in diameters from 9 ft. to 13 ft. for all engines from approximately 200 hp. to 1,000 hp. Latest addition is the constant speed control unit designed to maintain constant r.p.m. under varied power and load conditions.

Personnel: (Hamilton Standard is a division of United Aircraft Manufacturing Corporation) Raycroft Walsh, general manager; S. A. Stewart, assistant general manager; F. W. Caldwell, engineering manager; Erle Martin, chief engineer.

Hartford Machine Screw Company

MANUFACTURERS of screw machine products of all types for aircraft use.

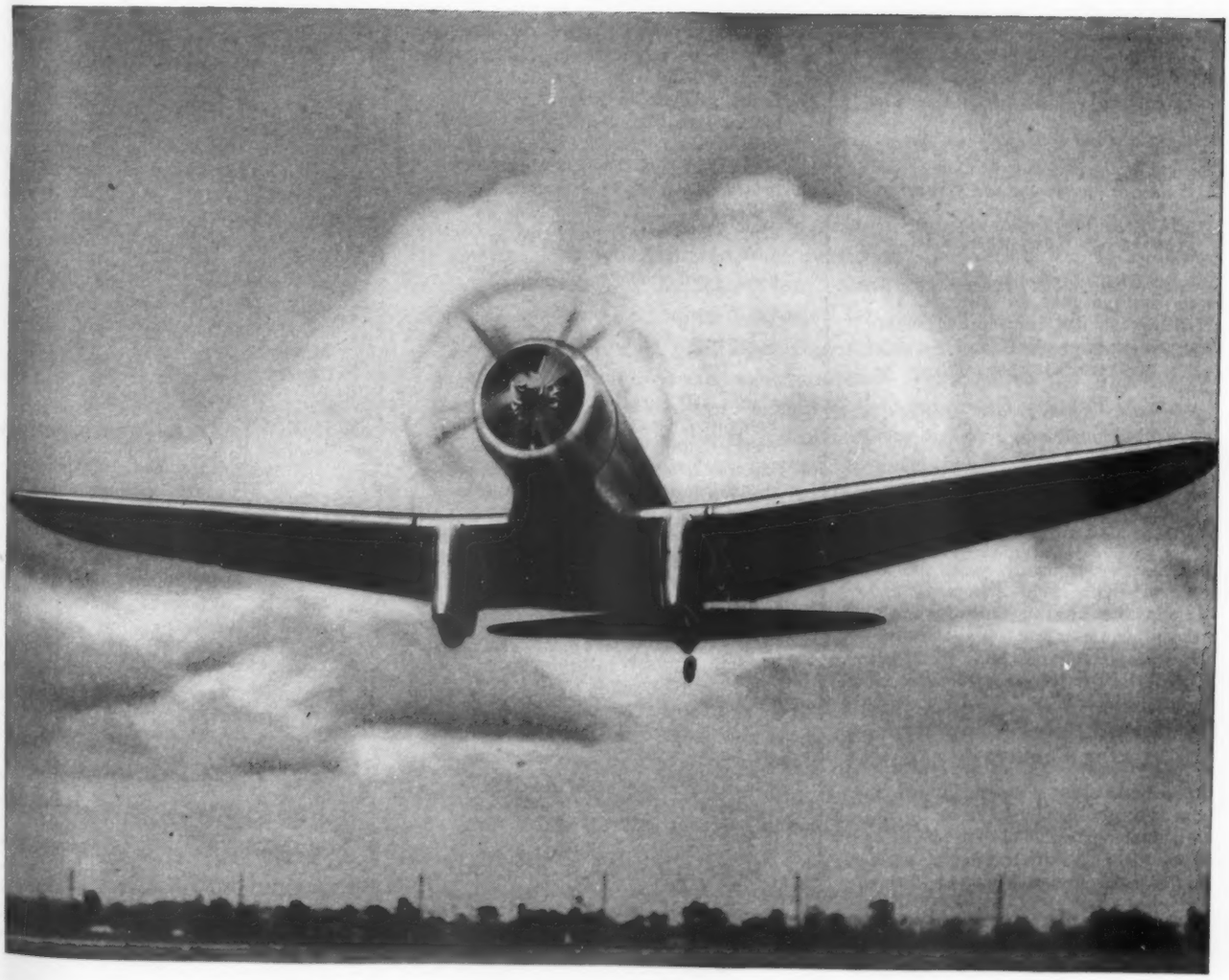
Personnel: H. E. Penfield, president; J. A. Taylor, vice-president; A. R. Grane, treasurer; Wm. McCarroll, secretary.

Hartzell Propeller Company

MANUFACTURER of wooden propellers for commercial aircraft, also contractors to the Army and Navy for metal propeller blades.

Personnel: R. N. Hartzell, president; Mrs. George Hartzell, vice-president; I. B. Norris, secretary-

TAKE-OFF



YOU have to have power to take off—or you stay on the ground. Airplanes fly on a strictly cash and carry basis. Extra pounds of pay-load make the difference between operating in the red or black. More power per pound of engine weight allows more pounds of pay-load. Oil companies have answered the demands for more power with high octane gasoline that can take it—and take off. Ethyl Gasoline Corporation, Chrysler Building, New York City.

treasurer; Frederick Choravoy, chief engineer.

Harvey Radio Laboratories

A NEWCOMER in the aircraft field, this company is offering the type 200S radio transmitter for airport and traffic control use.

Personnel: James B. Parker, general manager.

Hayes Industries, Inc.

THIS COMPANY has taken over the assets of the Automotive Fan and Bearing Company and manufactures aircraft, wheels and brakes under the trade name Autofan. Products include a complete line of low-pressure landing wheels with mechanical or hydraulically operated brakes; low-pressure tail wheel; also a complete line of streamline wheels and brakes in all usable sizes, fitted either with mechanical or hydraulic brakes. Streamline tail wheels are also available.

Personnel: C. B. Hayes, president; Charles Hollerith, vice-president; E. C. Hollerith, secretary and treasurer.

Heintz & Kaufman, Ltd.

AERONAUTICAL products include automatic antenna reel for aircraft, aircraft microphones, transmitting tubes, generators, power plants, radio wiring cables, and other aircraft radio equipment.

Personnel: R. M. Heintz, president; Jack Kaufman, vice-president and treasurer.

Hill Aircraft Streamliners Company

SPECIALISTS for many years in all types of sheet metal stampings and spinnings for aircraft fairings, cowls, fuel and oil tanks, etc.

Personnel: John A. Hill, president; K. W. Abbott, secretary.

Homestead Valve Manufacturing Company

HYPRESSURE JENNY, manufactured by this company is widely used in aircraft maintenance and overall bases for cleaning aircraft and engine parts. Available in fixed and portable forms.

Personnel: W. R. Schuchman, president; B. F. Schuchman, vice-president; F. E. Schuchman, treasurer, secretary, sales manager; J. W. Force, chief engineer.

Ideal Clamp Manufacturing Company

PRODUCTS available for the aviation industry are: hose clamps (all types); pump hose bands, sheet terminals, (electrical), hornbuttons.

Personnel: Francis Rauch, president; L. F. Rauch, vice-president; L. J. Rauch, treasurer, chief engineer; Philip Rauch, secretary, sales manager.

Industrial Engineering & Manufacturing Company

THIS CONCERN designs and manufactures aircraft parts (controls, landing gear, shock struts and hydraulic mechanisms) and also specializes in stainless steel stampings.

Personnel: E. Kottsieper, owner; H. Deliman, secretary.

International Flare Signal Company

COMPLETE LINE of signalling devices includes parachute flares (1, 1½, and 3 minutes duration), parachute signal lights (30 to 35 seconds duration), meteor signal lights (8 to 10 seconds), flare crystals (for 1 minute flares), also flare switches, flare mounting brackets and other accessories.

Personnel: A. F. Hubbard, president, treasurer; H. B. Watkins, vice-president; L. L. Driggs, Jr., secretary, chief engineer.

Irving Air Chute Company

SOLE PRODUCT of this company is parachutes and parachute equipment. All types of chutes for military and commercial use are available including lap, back, and seat packs, also quick detachable chutes, also chair chutes. A new type of harness has recently been developed for transport use which is suitable for both men and women in ordinary clothing.

Personnel: George Waite, president; L. L. Irvin, vice-president; D. A. MacLeod, secretary; L. H. Ford, treasurer.

Kollsman sensitive altimeter

Julian P. Frieze & Sons, Inc.

MANUFACTURER of instruments for meteorological and hydrometric observation including remote recording wind indicators and recorders, weather observation stations, both for ground use and for use on aircraft making upper air soundings.

A division of Bendix Aviation Corporation.

J. V. W. Corporation

THIS COMPANY controls the distribution of the Link ground trainer, a device for training pilots in a cockpit mock-up, controllable to simulate an airplane in flight, fitted with full complements of navigating instruments and radio.

Personnel: C. S. Jones, George Vaughn, Richard Watham.

Walter J. Kidde Company

SPECIALISTS in fire extinguishing equipment for use on board aircraft. Lux fire extinguishing systems are widely used on transport and military aircraft of all types. Recently Lux equipment has been made available for installation on privately owned aircraft.

Personnel: Walter Kidde, president; Walter Freygang, vice-president; I. R. Lewis, treasurer, secretary; Clifford Strain, sales manager; C. L. Griffin, in charge of aero equipment.

Kollsman Instrument Company

KOLLSMAN instruments are now to be found on boards of most transport and military airplanes all over the world, as well as on a large number of privately owned craft. Products include: accelerometers, air speed indicators, altimeters (standard and sensitive), carburetor air temperature gages, clocks, compasses (including aperiodic), engine gage units, fuel quantity gages, fuel pressure gages, ice warning indicators, level flight indicators, landing gear warning units, manifold air temperature gages, manifold pressure gage, oil pressure gage, pressure warning units, pitot static tubes, speed and drift sight indicator, suction gage indicators, tachometers (centrifugal and magnetic), engine thermometer (oil), vertical speed indicator, vibration mounts, instrument lighting systems, quick mounting clamps. Under development: electric tachometers, turn indicators, remote indicating systems.

Personnel: Paul Kollsman, president; Walter Angst, vice-president; G. R. Adolph, secretary; Wesley Bonn, sales manager; V. Carbonara, chief engineer.

EDO FLOATS

BIG SEAPLANES

GIANTS of the SKY are EDO-EQUIPPED

To increase their usefulness economically and widen their range of operations, an increasing number of large planes, passenger and military, are being converted for seaplane use with Edo Floats.

The operating advantages of Edo-equipped seaplanes are important. Well above the water, passengers are both isolated and insulated from the noise and shock of waves. Their vision is never obscured by spray. Submerged obstacles, if struck, do no harm to the plane itself. Edo Floats are divided into as many as 22 permanently built-in watertight compartments—they are safe. If a float is damaged the ship may still be kept in service by quickly installing a temporary replacement float, while float repairs are efficiently made in the shop.

Large seaplanes, Edo-equipped, are easily handled. When taxiing at slow speeds, steering is facilitated by EDO's patented automatic water rudders. Docking is quickly accomplished, without large handling crews, by sliding the seaplane out of the water on the keels of its rugged floats.

For military use, the convertibility of seaplanes into land planes at will, doubles the utility of any given number of machines. Bombers, moreover, can utilize the standard, or fuselage, bomb bay. For long flights, reserve gasoline tanks may be fitted into the floats—requiring no change of armament facilities.

There are available today a number of large transport planes which can be changed over quickly and economically into efficient seaplanes with Edo float gear. Persons interested will receive complete information.

EDO AIRCRAFT CORPORATION
600 Second Street, College Point,
Long Island, N. Y.

Lear Developments, Inc.

MANUFACTURES radio equipment exclusively, including the following apparatus: Lear-O-Scope radio compass direction finders, aircraft radio transmitters, aircraft ground stations, aircraft receivers, blind landing systems.

Personnel: W. P. Lear, president; I. G. Johnson, vice-president; A. C. Miller, secretary.

Lewis Engineering Company

SPECIALISTS in temperature measuring device for instrument board and test use on aircraft, this company's products include: temperature indicators, calibrated to various scale ranges and with variously lettered dials (to specification); thermocouples, both of the gasket and stud types (special thermocouples made to order); thermocouple leads of the two-conductor type with asbestos insulation, moisture and oilproof; selector switches (rotary type in cases for instrument board mounting to handle from 1 to 28 thermocouples).

Personnel: Harris Whittemore, Jr., president; C. S. Austin, treasurer, secretary, sales manager; Manfred Johnson, chief engineer.

Littlefuse Laboratories

APPLICABLE to aircraft use among this company's products are compact cartridge type fuses for the protection of electrical circuits.

Personnel: E. V. Sundt, president and chief engineer; B. Kollath, vice-president and treasurer.

Macwhyte Company

PRODUCES aircraft cable in tinned steel, galvanized steel and stainless steel (both in preformed and non-preformed types); also solid tie rods (streamline, round, square).

Personnel: G. S. Whyte, president; J. S. Whyte, vice-president and general manager; H. E. Sawyer, treasurer; H. Gay, secretary; R. G. Deihl, sales manager; R. B. Whyte, chief engineer.

Marlin-Rockwell Corporation

AERONAUTICAL products: Single row ball bearings; double row ball bearings; single row, narrow type bearings; aviation width ball bearings; rocker arm bearings; supercharger bearings (precision).

E. B. Meyerowitz

PRODUCTS: Aeronautical goggles.

Personnel: E. DuP. Meyerowitz, president; W. N. Cook, vice-president;

Lewis thermocouple switch.

J. F. Schultz, secretary and treasurer; W. N. Cook, sales manager.

Moto Meter Gage & Equipment Company

PRODUCTS: Oil and fuel pressure gages, ammeters, vacuum gages, ice warning indicators, thermometers for aircraft.

Personnel: R. G. Martin, president; W. V. Flood, secretary and treasurer; A. Weiss, sales manager; L. H. Middleton, chief engineer.

Motor Improvements, Inc.

CHIEF aviation product is a filter supplied as auxiliary equipment to such manufacturers as Eclipse Aviation. A portable filter (Purolator) for use on gasoline delivery hose also available.

Personnel: J. A. Graham, president; R. R. Layte, vice-president; H. W. Thogode, treasurer; T. M. Owen, secretary; J. M. Clarke, sales manager; L. W. Williams, chief engineer.

New Departure Manufacturing Company

PRODUCTS: Ball bearings for all purposes.

Personnel: DeWitt Page, president; F. G. Hughes, vice-president and general manager; M. L. Prentis, treasurer; L. G. Sigourney, secretary.

Norma-Hoffman Bearings Company

NORMA - HOFFMAN precision, ball, roller and thrust bearings have wide application in the aviation field in all types of engines, engine accessories, instruments, radio equipment, airplane accessories and landing field equipment.

Personnel: W. M. Nones, president; O. P. Wilson, vice-president; H. J. Ritter, sales manager; G. R. Bott, engineering manager.

Nicholas-Beazley Airplane Co., Inc.

DISTRIBUTOR of all types of airplane and engine accessories.

Personnel: Russell Nicholas, president; C. M. Buckner, vice-president; Cary Huston, treasurer; Howard Beazley, secretary; C. A. Dell, sales manager.

Packard Electric Corporation

PRODUCTS include all types of high tension and secondary electrical cable for aircraft use (one, two or three conductors), with plain, braided and metallic shielding covers.

Personnel: B. N. MacGregor, vice-president; G. S. Carr, sales manager equipment division; R. G. Montgomery, sales manager, replacement division; L. C. Wolcott, chief engineer.

The Palnut Company

ONLY product is a stamped sheet metal spring steel lock nut used by many aircraft and engine builders.

Personnel: J. R. Hotchkin, president and chief engineer; A. H. Beggs, vice-president and sales manager.

Parker Appliance Company

PARKER products include a wide range of hardware and fittings for aircraft fuel systems. Also have available tools and appliances for tube bending, etc. Supplies tube assemblies, bent and fitted up according to specification.

Parker-Kalon Corporation

MANUFACTURES fastening devices, including self-tapping screws, drive screws, wing nuts, thumb screws, cap nuts, etc., in a wide range of materials and sizes.

Perfect Circle Company

MANUFACTURING of piston rings and piston ring tools for aircraft engines.

Personnel: C. N. Teetor, president; Lotharr Teeter, vice-president; L. B. Davis, secretary-treasurer; D. H. Teetor, sales manager; R. R. Teetor, chief engineer.

Pioneer Instrument Company, Inc.

AERONAUTIC products now include: air distance recorder and transmitters, air speed indicators, altimeters, accelerometers, ammeters, bank indicators, climb indicators, clocks, compasses (magnetic and air inductor), drift indicators, fuel gages, manifold pressure gages, octant, oxygen regulators, pitch

WESTON Model 602
Cylinder Temperature Indicator

WESTON Model 606
Carburetor Air Temperature
Indicator

WESTON Model 606
Oil Temperature Indicator

WESTON Model 602
Radio Compass Indicator

WESTON Model 506
Volt-Ammeter

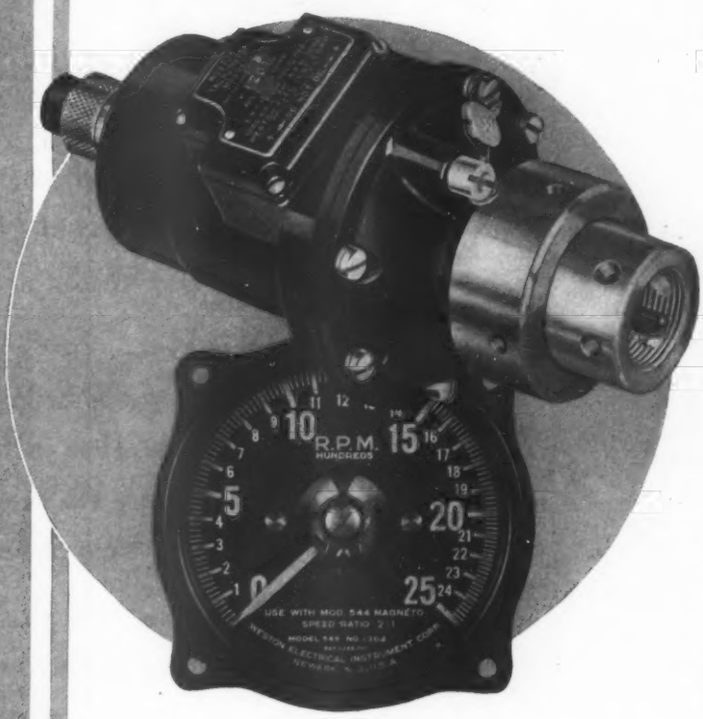
A New

WESTON

AIRCRAFT TACHOMETER

(Model 724-B)

embodying these important new features



EFFICIENT STATIC SHIELD
—affords complete protection to radio equipment.

STURDY PLUG TYPE CONNECTOR
—provides a quick and simple method of connection.

NEW TYPE COUPLING NUT
—eliminates necessity for large wrenches.

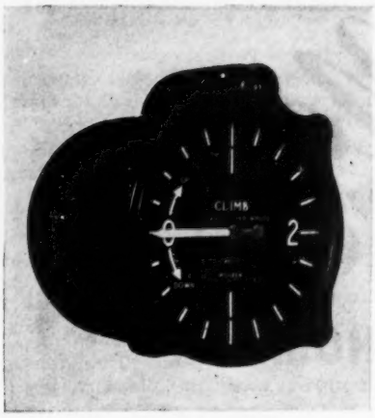
IMPROVED COMMUTATOR AND BRUSH CONSTRUCTION
—new material provides long life in service.

INCREASED VOLTAGE
—providing even better temperature compensation.

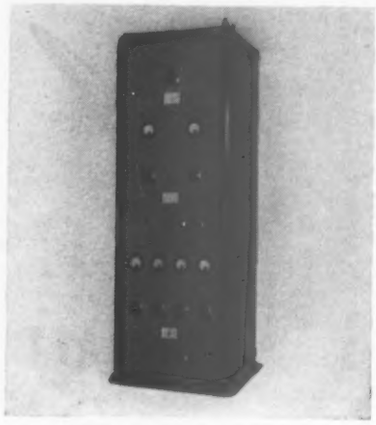
RUGGED CONSTRUCTION THROUGHOUT
—keeps maintenance low.

These and other features of the newly designed WESTON Tachometer merit immediate investigation. Full data on Model 724-B, and other WESTON instruments for aircraft service are available . . . Weston Electrical Instrument Corp., 616 Frelinghuysen Ave., Newark, N. J.

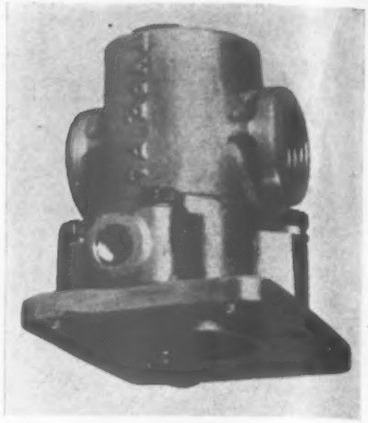
WESTON *Instruments*



Pioneer climb indicator.



RCA airport transmitter.



Romec fuel pump.

indicators, pressure gages, suction gages, tachometers, thermometers. Latest addition is the Autosyn system of remote indications for instrument and other applications.

Personnel: Vincent Bendix, president; R. P. Lansing, W. A. Reichel, vice-presidents; W. J. Buettner, treasurer; H. A. Gossner, secretary; R. H. Isaacs, sales manager; W. A. Reichel, chief engineer.

Protectoseal Company

MANUFACTURERS of safety devices for hazardous liquids including safety cans for handling gasoline around airports, Protectoseal filler caps for aircraft gasoline tanks, etc.

Pyrene Manufacturing Company

PRODUCT: Fire extinguishing apparatus of all types for airports and airplane use.

Personnel: E. A. Clapp, president; E. J. Waring, vice-president; E. A. Clapp, treasurer; E. G. Weed, secretary; G. H. Boucher, sales manager; William Rae, chief engineer.

Raymond Manufacturing Company

FURNISHES the aviation industry with coil springs, flat springs, and small metal stampings to order.

Personnel: F. M. Raymond, president; F. F. Barnes, vice-president; F. E. Whittlesey, secretary-treasurer; J. E. Mount, sales manager and chief engineer.

R.C.A. Manufacturing Company

THE R.C.A. line of aviation equipment for 1936 includes: aircraft-beacon entertainment receivers; aircraft-beacon communication receivers; aircraft-beacon receivers; aircraft communication receiver; 10-watt two-frequency aircraft transmitter; 50-watt three-frequency aircraft transmitter; 30-watt, three-frequency aircraft transmitter; aircraft radio compass; airport traffic control transmitter; airport 25-watt three-frequency communication transmitter; airport 125-watt three-frequency communication transmitter; airport radio beacon linear amplifier; airport radio beacon attachment; airport doublet receiving antenna.

Personnel: E. T. Cunningham, president; G. K. Throckmorton, vice-president; J. D. Cook, treasurer; F. H. Corregan, secretary; D. S. Little, sales manager aviation radio section; H. E. Allen, chief engineer aviation section.

Rieker Instrument Company

PRODUCTS: aircraft pitch and bank indicator of the liquid and ball type.

Personnel: W. C. Rieker, president; E. J. Rieker, vice-president; R. McLaughlin, secretary.

E. S. Ritchie & Sons, Inc., Ltd.

MANUFACTURES for the aviation industry the Ritchie Aperiodic magnetic compass and the DeFlorez compass mounting.

Personnel: R. C. Ritchie, president and treasurer; T. M. Reynolds, secretary.

Romec Pump Company

MAKERS of pumps and valves for aircraft fueling systems, including: hand pumps (with and without strainers); vacuum pumps for aeronautical gyroscopic instruments; engine driven fuel pumps (including release valves, by-pass valves and strainers); balanced release and by-pass valve pumps with supercharger connection to hold close fuel flow regulation under varying conditions; retractable landing gear pumps (built in to Eclipse starter motor).

Personnel: E. W. Beidler, president; Hayden Eames, vice-president; W. L. Davis, general manager; B. A. Schulze, secretary-treasurer.

Russell Manufacturing Company

RUSCO products include shock absorbing Aero rings, also webbing safety belts of several quick release designs.

Personnel: G. M. Williams, president; C. J. Sherer, vice-president and treasurer; A. P. Smith, secretary; F. A. Gerard, sales manager; T. M. Russell, chief engineer.

Scintilla Magneto Company, Inc.

THE PRODUCTS of this subsidiary of Bendix-Aviation Corporation include: aircraft magnetos; aircraft battery ignition systems; aircraft shielded spark plugs, shielded cable, harness and ignition switches.

Personnel: Vincent Bendix, president; T. Z. Fagan and H. Hanni, vice-presidents; G. E. Steiner, secretary-treasurer; W. J. Spangler, chief engineer.

Seamlex Company

AVIATION products include: flexible seamless metallic tubings for oil and gasoline lines on engines, etc. (in bronze, aluminum and monel); fittings and hardware for flexible tubing.

Personnel: F. F. Jacobson, president and chief engineer; C. K. Freeman, sales manager.

Sensenich Bros.

PRODUCTS: Wooden aircraft propellers.

Personnel: H. M. Sensenich, treasurer and sales manager; M. L. Sensenich, production engineer.

Regular Equipment on America's Leading Planes!

FORMICA PULLEYS & FAIRLEAD BUSHINGS

A VERY high percentage of the aeroplanes produced in the United States are fitted with Formica control pulleys and fairlead bushings.

The material is preferred because of the stability of its dimensions under widely varying conditions. Pulleys are available with all types of approved bearings.

Fast service on accurate and uniform parts has played its part in building up the popularity of Formica for these purposes.

Send us your inquiries.

THE FORMICA INSULATION COMPANY
4628 Spring Grove Avenue Cincinnati, Ohio

FORMICA

AERONAUTICAL EQUIPMENT

SKF Industries, Inc.

MANUFACTURERS of ball and roller bearings in a wide range of sizes and types with many applications to aircraft engines and aircraft assemblies.

Personnel: Dr. W. L. Batt, president; R. F. Runge, vice-president; T. W. Dinlocker, secretary-treasurer; R. H. Demott, sales manager; G. Palmgren, chief engineer.

Sky View Camera Company

MANUFACTURERS of the Sky View camera, a hand-held type designed primarily for the private pilot.

Personnel: B. Worster, president.

Solar Aircraft Company

SPECIALISTS in exhaust manifold systems for aircraft engines. Manufacturers also of heaters, air scoops, tanks, etc.

Personnel: E. T. Price, president; C. S. Marston, vice-president and secretary; J. P. Seamons, chief engineer; A. W. Briggs, treasurer.

Sperry Gyroscope Company, Inc.

MANUFACTURER of gyroscopic navigational instruments including the Sperry horizon and the directional gyro. Developed and now manufacture the Sperry automatic pilot which offers completely automatic flying control for aircraft. Now in use on many commercial and military airplanes. Among recent Sperry activities is the soundproofing of aircraft. Sperry soundproofing has been used on such recent transports as the Douglas DC 2, the Martin 130 and other large airplanes.

Personnel: R. E. Gillmor, president; P. R. Bassett, Alexander Schein, Robert B. Lea, vice-presidents; Cleemann Withers, treasurer; H. H. Thompson, secretary; R. B. Lea, sales manager; C. R. Bassett, chief engineer.

Steel Products Engineering Company

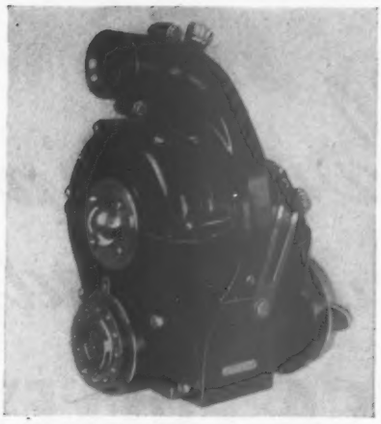
MANUFACTURER for the aircraft industry of: airplane engines and parts, gears, gasoline segregators, fuel level signals, automatic fuel valves, single cylinder test engines.

Personnel: J. E. McAdams, president; S. L. Tatum, R. C. Goddard, vice-presidents; J. E. McAdams, treasurer; I. W. Clark, secretary; W. C. Jordan, general manager.

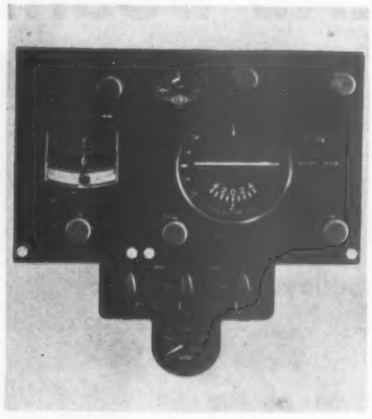
Stempel Fire Extinguisher Manufacturing Company

MANUFACTURERS of fire extinguishers, also of oiled clothing, rubber gloves, safety gasoline cans and chemical engines.

Personnel: H. A. Greene, president; F. M. Greene, vice-president; Cassin Snyder, treasurer; Herbert Simpson, secretary; F. M. Green, sales manager; H. O. Lodes, general manager.



Scintilla shielded magneto.



Sperry automatic pilot.

Stewart Hartshorn Company

MANUFACTURERS of airplane tie rods, both streamline and square section, and accessories for tie rods.

Personnel: Stewart Hartshorn, president; F. A. Neal, vice-president; J. M. Layng, secretary-treasurer and sales manager for aircraft products; H. W. Watts, chief engineer.

Summerill Tubing Company

PRODUCT includes all grades, sizes and shapes of aeronautical steel tubing (round, square, streamlined). Standard tubings furnished in a bright oxide-free finish.

Personnel: E. L. Parker, president; J. P. Boore, vice-president; G. P. Kramer, secretary-treasurer; J. P. Dods, sales manager; R. R. Lawson, chief engineer.

Suncook Mills

MANUFACTURES a complete line of Grade A airplane fabric and tapes as well as balloon fabric and reinforcing tape in accordance with A-N specifications.

Personnel: W. R. Peabody, president; J. L. Weld, treasurer; V. Dietz, Jr., sales manager.

Swift Lubricator Company

CHIEF product of aeronautical interest is the Viele water-locking foot valve designed to prevent water being pumped out of gasoline storage tanks. The valve is adaptable also to tank trucks.

Personnel: C. W. Swift, president.

Switlik Parachute & Equipment Company

PARACHUTE makers for commercial and government pilots. Chutes available in white or pongee silk in seat, back, quick attachable, chest or chair type. Manufacturer also of flying suits, helmets and safety belts.

Personnel: Stanley Switlik, president; P. W. Switlik, vice-president; Walter Switlik, secretary; M. H. St. Clair, chief engineer.

Thiokol Corporation

THIOKOL synthetic rubber products have a variety of uses in the aviation industry. May be made up into gasoline and oil-proof hose, gaskets, etc. Thiokol powder also available to be molded into various shapes.

Personnel: Bevis Longstreth, president; J. C. Patrick, vice-president; H. A. Richards, secretary-treasurer.

Thompson Products, Inc.

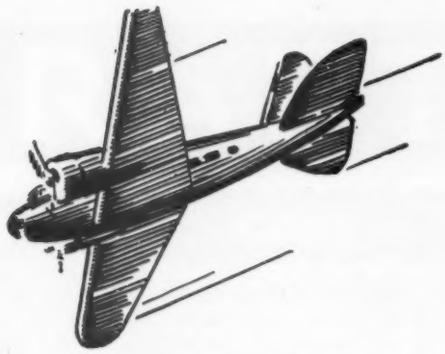
WELL KNOWN in the aircraft engine industry are Thompson valves. Available in both the solid and hollow stemmed types. Hollow stems contain chemically pure sodium which acts as a coolant. Valve seats are plain or Stellite inlaid. Exterior surface of valves ground and polished all over. In addition to valves the company manufactures: valve insert seats, pistons, piston rings, tappets, and other hardened and ground alloy steel products.

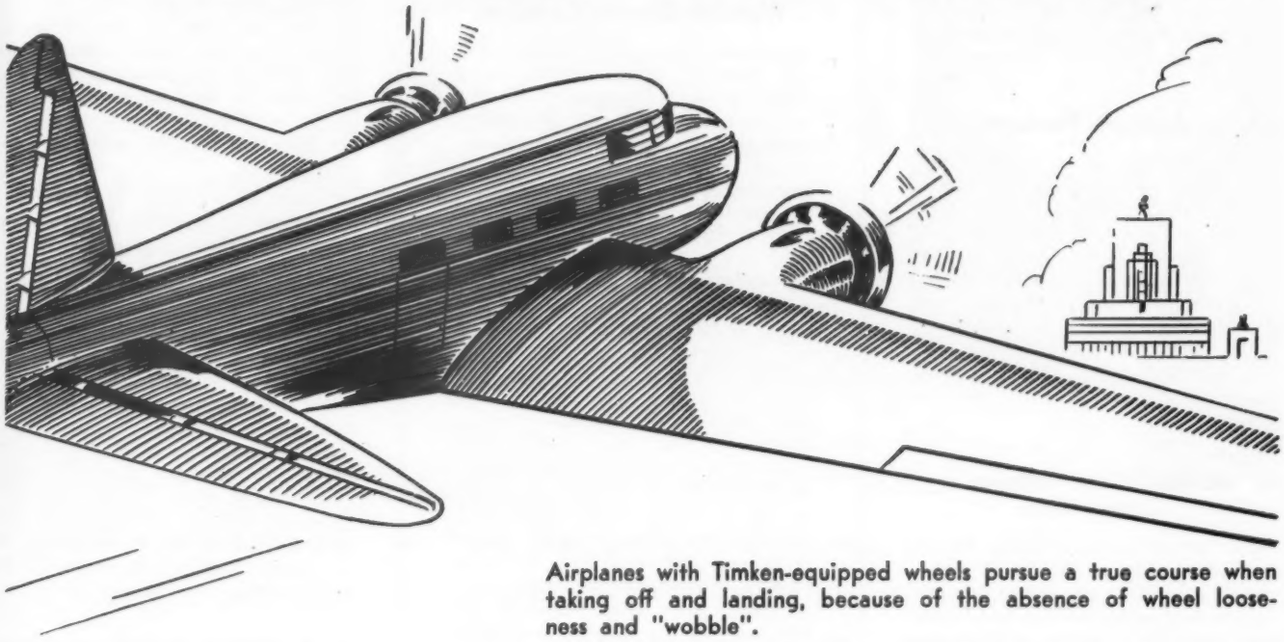
Personnel: F. C. Crawford, president; L. M. Clegg, vice-president; W. M. Albaugh, secretary-treasurer; L. M. Clegg, sales manager; A. T. Colwell, chief engineer.

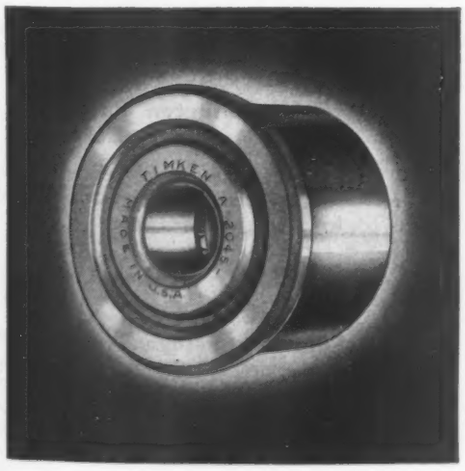
Timken Roller Bearing Company

MANUFACTURES bearings for use in airplane engine rocker arms and in airplane landing wheels.

Easy Take-Offs— Smoother Landings WITH TIMKEN-EQUIPPED WHEELS







Airplanes with Timken-equipped wheels pursue a true course when taking off and landing, because of the absence of wheel looseness and "wobble".

Timken-equipped landing and tail wheels have practically eliminated ground looping and other uncertainties. They operate as smoothly and steadily as the wheels on your automobile—and are just as dependable.

Airplane wheels are only used for a few minutes at the beginning and end of a flight—but those few minutes are vital. That is why an overwhelming majority of modern airplanes of all types and sizes —from tiny single seaters to giant transports—have Timken-equipped wheels. It will pay you to see that you get them on your planes.

Timken Rocker Arm Bearings Improve Engine Performance and Increase Dependability

Friction and wear are superseded by smooth, wear-free operation when Timken Rocker Arm Bearings are installed. Lubrication is simplified. Bearing replacements are reduced. Maintenance cost is cut.

The value of Timken Rocker Arm Bearings has been definitely proved and is being demonstrated every day by their performance in leading makes of radial engines. It will pay you to have them in your engines.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *TAPERED ROLLER* BEARINGS

Titanine, Inc.

MANUFACTURE for the aircraft industry: dopes, lacquers, primers, adhesive cement.

Personnel: E. G. Davis, president and treasurer; I. F. Browne, secretary; William Bagley, sales manager.

Titeflex Metal Hose Company

MANUFACTURE Titeflex all-metal pressure tubing which is widely used for gas and oil fuel lines in the aviation industry. Manufacture also couplings suitable for use with this tubing.

Personnel: C. W. Fletcher, president; R. H. Stone, vice-president; P. L. Proctor, treasurer; H. L. Marring, secretary; E. E. Husted, sales manager; M. A. Brisinger, chief engineer.

United Aircraft Products, Inc.

MANUFACTURERS of all kinds of fuel pumps, fuel pump hardware, strainers, release valves, timing systems, engine control, oil coolers, etc. Also, oil temperature regulators, conduit fittings, bomb racks, solenoid assemblies, etc.

Personnel: T. M. Hiester, president; S. J. Sorensen, vice-president; J. G. Lehman, treasurer; D. W. Brunett, secretary; J. G. Lehman, sales manager; R. G. Dykeman, chief engineer.

United-Carr Fastener Corporation

ALL TYPES of button and snap fasteners for upholstery and for wood-to-metal assemblies are offered. Cowl fasteners of both the flush and button type available. Supplies also closures of the zipper type.

Personnel: Sinclair Weeks, president and treasurer; Preston Upham. vice-president; A. S. Boynton, secretary; G. S. Maynard, sales manager; R. O. Chaffee, chief engineer.

Wallace Barnes Company

MANUFACTURER of wire springs, flat springs, special springs, small washers, and small stampings.

Personnel: J. E. Andrew, president; R. W. Cook, D. C. Buffum, H. B. Reid, vice-presidents; H. C. Barnes, treasurer; H. B. Reid, sales manager.

Weems System of Navigation

SUPPLIER of all types of navigation equipment including: Aircraft platter, Gatty ground speed and drift meter, Gatty drift indicator, second setting navigation watch, aircraft sextant, Dalton aircraft navigational computor, also a full line of maps, charts, special slide rules, etc. Home study courses and a navigational consultant service also offered.

Personnel: P. V. H. Weems, president; Col. Alexis Illyne, executive secretary.

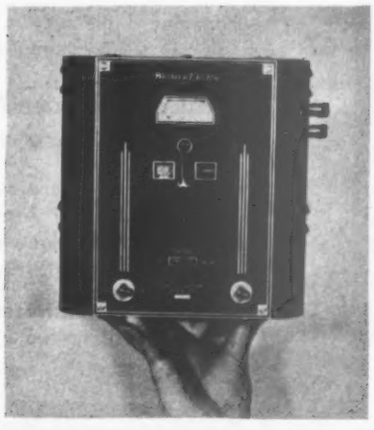
Wellington Sears Company

MANUFACTURER since the War of structural fabrics for airplanes and balloons. Principal products: B-A-30 cloth (4 oz. per sq.yd., 80 lb. per in. tensile strength); B-B cloth (3 oz.—60 lb. per in.); H-H cloth (2 oz., 40 lb. per in.).

Western Electric Company

SPECIALISTS for many years in aircraft and airways communication equipment. Present aeronautical products include radio equipment for ground, transport and private use as follows: aircraft radio receivers (eight types operating within the bands from 190 to 10,000 kc., with local and remote control, telephone or telegraph reception, single or multi-band reception, and certain types of crystal control); aircraft radio transmitters (three types, 10, 20 and 50 watts, covering 1,500 to 7,000 kc., for telephone or continuous wave telegraphy); aircraft radio accessories (microphones, head sets, inter-phone equipment; dynamotors, control units, cords, plugs, jacks, cable and vacuum tubes); ground receivers (three types—local or remote control, 3,500 to 7,000 kc.); ground transmitters (three types—from 10 to 400 watts, local or remote control, telephone or continuous wave telegraphy, with maximum of ten preselected, crystal control frequencies automatically selectable).

Personnel (aeronautic): H. E. Young, general commercial engineer; E. W. Thurston, commercial sales engineer; H. N. Willets, radio sales engineer; F. C. McMullen, D. R. Husted, A. E. Brundage, aviation radio specialists.



Western Electric aircraft transmitter.

Westinghouse Electric & Manufacturing Company

WESTINGHOUSE products for the aviation industry include: electric power supply (dynamotors, generators, etc.); radio equipment (radio telegraph transmitters, telephone and telegraph transmitters for transport and private flyer use, receivers for communication, receivers for marker and range beacons); battery indicators (voltmeters, ammeters); micarta control pulleys; light weight circuit breakers; electrically operated fuel valves; landing lights. Airport equipment includes: airport and airways beacons; floodlights, boundary lights, lighting control units; motor generator sets, electric motors, air conditioners, battery chargers, electric welding equipment, electric heat treating and tempering furnaces.

Weston Electrical Instrument Corporation

WESTON aircraft instruments include: engine synchroscopes, electric tachometers, low temperature measuring instruments, cylinder temperature thermometers, radio compass indicators, blind landing indicators, volt-ammeter, ammeter, voltmeter, radio shielding. Manufactures also a range of special testing instruments.

Personnel: E. F. Weston, president; Caxton Brown, vice-president and secretary; Earl Mellen, treasurer; H. L. Gerstenberger, sales manager; W. N. Goodwin, Jr., chief engineer.

S. S. White Dental Manufacturing Company

PRINCIPAL products for aviation industry: flexible shafts for tachometer drives.

Worthington Pump & Machinery Corp.

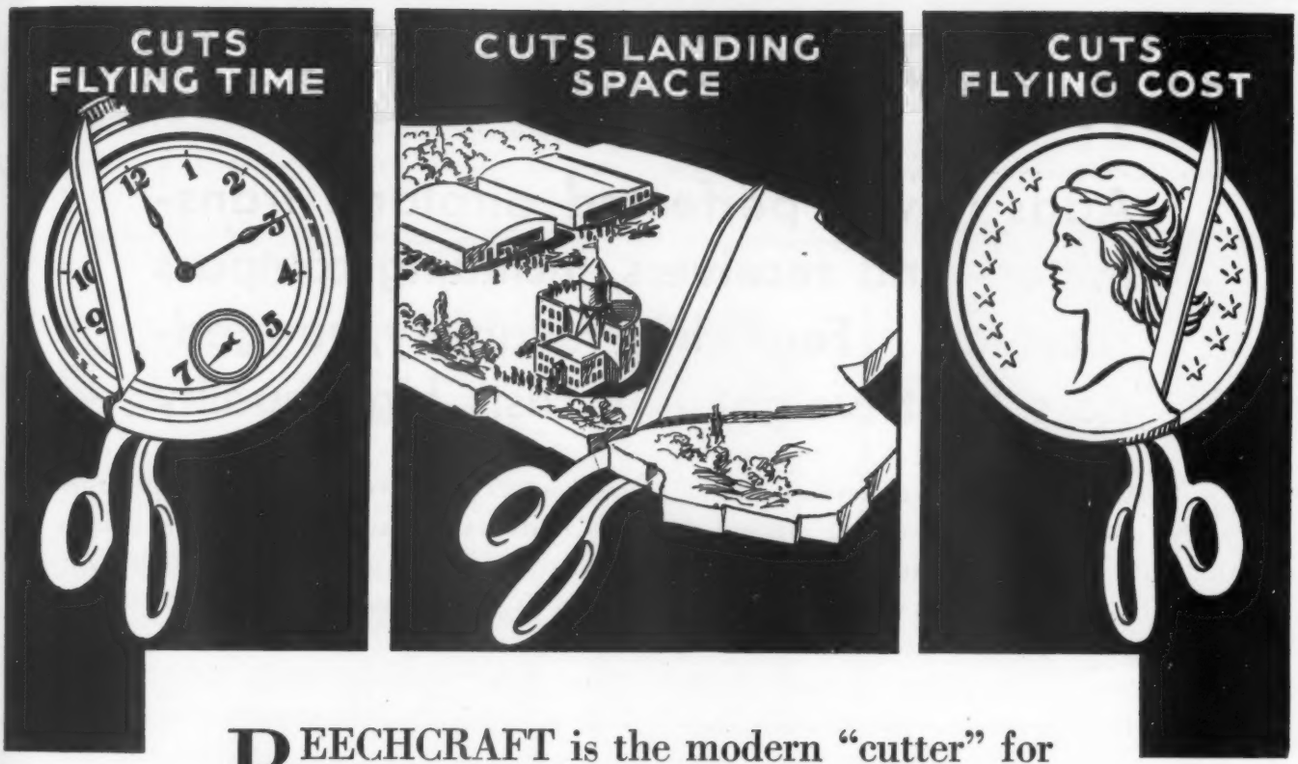
OF CHIEF interest to the aeronautical industry are air compressors suitable for shop and airport use.

Yoho & Hooker Lumber Company

SUPPLIER of woods and wood products to the aircraft industry. Products include: Sitka spruce, aircrift spar (plywood), basswood, Co-vo-co plywood, birch, and miscellaneous woods to aircraft specifications.

Personnel: Jud Yoho, president; D. E. Hooker, vice-president; S. D. Johnston, secretary-treasurer; S. M. Rice, sales manager.

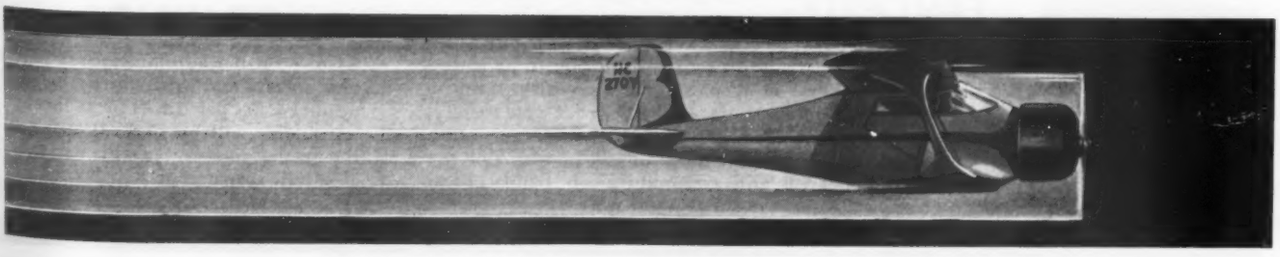
BEECHCRAFT



BEECHCRAFT is the modern "cutter" for the private flyer. It cuts flying time off old flight schedules. It cuts off landing space required by other high speed craft. It makes a big cut in operating costs. If you are interested in a highly efficient airplane that combines an extra measure of safety with extra speed write for information about the New Beechcrafts.

THE BEECH AIRCRAFT COMPANY

WICHITA, KANSAS



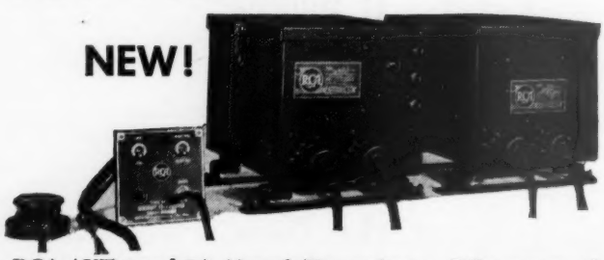
RCA EXPANDS AVIATION LINE!

Adds newly perfected airplane transmitters and receivers, including compass receiver . . . Featuring reliability, ruggedness, light weight, low costs, high quality

NOW RCA announces several new aviation radio instruments, making the RCA line more complete than ever before, expanding its usefulness to cover every aviation need. All RCA receivers, transmitters and accessories are backed by years of experience in every radio communication field. Conversion of this experience to aviation purposes has been accomplished with the assistance of pilots and airport operators. RCA owns and operates its own planes, and conducts a hangar at the Camden Airport. It knows aviation radio, is familiar with every requirement and need, and how to fill it to the utmost satisfaction of the user. See this complete line, every item of which is a practical, efficient and economical unit.

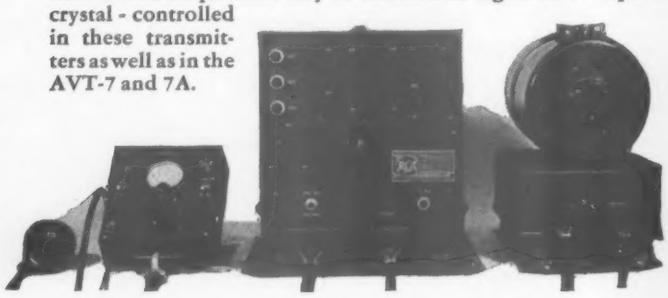
FOR AIRCRAFT

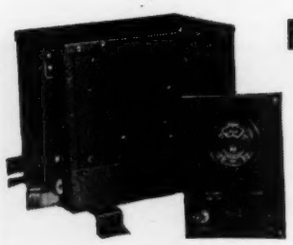
NEW!



RCA AVT-7 and 7A Aircraft Transmitters. Offer communication by 100% modulated high quality radio telephony, or CW telegraph. These new, sturdy, lightweight transmitters have 10 watts power on phone and CW. AVT-7 has a vibrator power unit and weighs 28 pounds net. AVT-7A has a dynamotor power unit, weighs 26½ pounds net. Both operate off standard 12-volt battery supply. Primarily designed for the itinerant flyer. Phone or CW on either of two pre-determined frequencies are instantly selected in flight by flipping a switch.

NEW! RCA AVT-12 and 12A. Offer the same basic features of the 7 and 7A but have higher power, AVT-12 having 50 watts on phone, 75 on CW; AVT-12A, 30 watts on phone, 45 on CW. Weights, 69 and 57 pounds respectively. Both use dynamotor power supply. Any one of three predetermined frequencies may be selected in flight. The output is crystal - controlled in these transmitters as well as in the AVT-7 and 7A.





FAVORITE! RCA AVR-7 and 7A Aircraft Receivers. These two 4-tube superheterodyne receivers have proved exceptionally popular during the past year and are to be found today on ships in all parts of the country. Remote control. Operate from either 6 or 12-volt battery, no other batteries required. AVR-7 offers reception on the beacon and entertainment bands, AVR-7A on the beacon and communication bands. Ideal companions to the AVT-7 and AVT-12.

COMING!

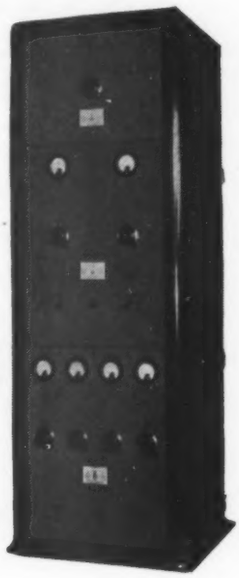
RCA AVR-8 Radio Compass. This new instrument will shortly be announced. Its price will be as low as its quality will be high. Watch for the initial offering of this remarkable new instrument.

FOR AIRPORTS

RCA equipment for airports is built to meet the practical requirements of ground operation, combining technical excellence with rugged reliability, operating simplicity and low cost. The transmitting equipment is especially noteworthy for its non-obsolescence feature. This equipment is built somewhat on the plan of a sectional bookcase, permitting growth from time to time as additional facilities are required, with little or no scrapping of original units. This plan is additional proof of RCA value.

NON-OBSOLESCENCE

RCA AVT-8, 125-watt Telephone and Beacon Transmitter. This is built upon the AVT-1A, with the addition of the power amplifier and beacon units. This feature allows for growth.



RCA AVT-1A Airport Radio Traffic Control Transmitter provides 100% modulated high quality telephony over the required aviation bands. Completely self-contained. Operates from 110-volt AC circuit. Power output, 15 watts even into inefficient antenna affording certain range of 30 miles. May also be used for CW and MCW. When not on the air, can be used as speech amplifier for airport public address system.

RCA AVT-4 consists of the AVT-2 plus an amplifier unit, which increases power to 125 watts. Note advantage of RCA coordinated design.

RCA AVT-2 Airport Communication Transmitter, 25 watts power, 100% modulated telephony, CW and MCW on three high frequency channels. Completely self-contained.

RCA AVR-5A Airport Receiver. A 9-tube superheterodyne, all-wave receiver, including beat-frequency oscillator for rapid tuning of telephone signals, and for reception of CW. Provision for headphones. The sensitivity and power of this receiver enable it to deliver to the operator a loud and easily understandable signal from distant or weak transmitters.

RCA AVA-4 Airport Antenna is a special double-doublet especially designed for reception on the aviation frequencies and therefore delivers to the aviation receiver a maximum of radio energy. Other features: noise reduction, operation of several receivers simultaneously, easy installation.

TAXI UP! Here is RCA Aviation Headquarters at Central Airport, Camden, N. J. All RCA aviation equipment is on display and demonstration. We'll take care of your ship while you come in and look over the line.

AIR ASSOCIATES, INC., Glendale, Cal.; Chicago, Ill.; Garden City, L. I.

or write direct to AVIATION RADIO SECTION

RCA MANUFACTURING COMPANY, INC.

Camden, N. J. A service of the Radio Corporation of America

Specifications of

Aviation does not assume

Manufacturer	Designation or Model No.	A.T.C. number	Price at factory	Type	Number of seats	Make of engine	Total rated hp.	At altitude, ft.	Fuel capacity (gal.)	Normal Range (mi.)	Fuel consumption at cruising speed (gal. per hr.)	Propeller Diameter—(in.)	High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)
Single-Engined Planes with Seats for One, Two, or Three Persons																			
Aeronautical Corp. of America	C-3	*396	$1,890	CML	2	Aeronca	36	S.L.	8	200	3.0	66	93	S.L.	85	S.L.	35	450	12,000
Aeronautical Corp. of America	LA			CML	2	Lb	70	S.L.	28	500	5.0	76	115	S.L.	100	S.L.	48	600	13,000
Aeronautical Corp. of America	LB			CML	2	Lb	85	S.L.	28	500	5.0	76	120	S.L.	105	S.L.	48	750	16,000
Aircraft Mechanics, Inc.	Flyabout D-1	439	1,450	CML	2	Con	37	S.L.	7	160	3.0	.....	80	S.L.	72	S.L.	.....	350	8,500
Aircraft Mechanics, Inc.	Flyabout D-2	449	1,575	CML	2	Sz	45	S.L.	7	150	3.0	.....	93	S.L.	77	S.L.	.....	700	13,000
Aircraft Mechanics, Inc.	Eaglerock A-14	.....	.....	OBL	3	Wr Ww	180	S.L.	65.5	500	14.0	.....	123	S.L.	107	S.L.	.....	928	16,000
Air Transport Mfg. Co.	P-2	.....	.....	OML	2	K	100	S.L.	30	450	.....	.....	130	1,000	105	1,000	.....	1,200	14,000
American Eagle-Lincoln Aircraft Corp.	American Eaglet B-32	450	1,575	OML	2	Sz	45	S.L.	10.5	250	3.0	76	90	.....	75	.....	28	450	14,500
Lawrence W. Brown Aircraft Co.	B-3	.....	8,500	CML	2	Men	250	5,000	58	600	.....	84	205	S.L.	190	S.L.	.....	1,200	18,000
Curtiss-Wright Airplane Co.	Coupe 19L	589	7,950	CML	2	Wa[9]	145	S.L.	50	.....	5.25	78	162	.....	142	5,000	40	850	17,000
Curtiss-Wright Airplane Co.	Sport 16-E	*463	.....	OBL	3	Wr Ww	175	S.L.	33	350	10.5	102	135	.....	115	.....	48	1,200	17,500
Curtiss-Wright Airplane Co.	Speedwing A-14-D	*442	.....	OBL	3	Wr Ww	250	S.L.	58	530	14.5	104	155	.....	132	.....	56	1,000	18,000
Curtiss-Wright Airplane Co.	Speedwing B-14-B	*485	.....	OBL	3	Wr Ww	350	.....	66	550	17.5	102	170	.....	145	.....	57	1,600	20,500
Curtiss-Wright Airplane Co.	Speedwing D-14-R	*	.....	OBL	3	Wr Ww	420	.....	76	500	.....	.....	185	.....	157	.....	57	1,800	24,500
Fairchild Aircraft Corp.	F. 22 C7-G	564	.....	OML	2	War	145	S.L.	60	730	9.7	83	135	.....	119	.....	55	730	16,000
Fairchild Aircraft Corp.	C8-E	* Pdg	.....	CML	3	War	145	S.L.	40	480	9.7	83	135	S.L.	120	S.L.	46	670	17,700
Fairchild Aircraft Corp.	C8-F	*Pdg	.....	CML	3	Ran	145	S.L.	40	525	9.0	83	137	S.L.	121	S.L.	46	545	15,120
Granville, Miller & De Lackner	Q. E. D.	.....	31,000	CML	2	Pwh	675	6,000	400	2,000	40.0	104	240	6,000	200	6,000	69	2,050	25,000
Great Lakes Aircraft Corp.	2-T-1-A	228	.....	OBL	2	Cir	100	.....	26	370	.....	78	110	.....	90	.....	.....	600	.....
Kinner Airplane & Motor Corp., Ltd.	R-Playboy	554	.....	CML	2	K	160	S.L.	44.5	580	9.8	94	140	S.L.	128	S.L.	50	800	15,000
Kinner Airplane & Motor Corp., Ltd.	B-Sportster	516	.....	OML	2	K	125	S.L.	35	400	8.0	90	112	S.L.	100	S.L.	40	900	15,000
Kinner Airplane & Motor Corp., Ltd.	K-Sportster	490	.....	OML	2	K	100	S.L.	35	450	7.0	90	104	S.L.	90	S.L.	40	800	14,000
Kinner Airplane & Motor Corp., Ltd.	Sportwing B-2-R	.....	.....	OML	2	K	160	S.L.	42	510	9.8	83¼	132	S.L.	120	S.L.	45	1,100	17,950
E. M. Laird Airplane Co.	LC-1B-285	2-501	11,000	OBL	3	Wr Ww	285	S.L.	85	700	16.2	102	160	S.L.	138	S.L.	46	1,500	21,500
E. M. Laird Airplane Co.	LC-B-300	353	10,850	OBL	3	Wr Ww	300	.....	76	550	.....	108	150	.....	120	.....	45	1,600	22,000
E. M. Laird Airplane Co.	LC-R-300	176	11,500	OBL	3	Wr Ww	300	.....	76	550	.....	114	175	.....	135	.....	55	1,500	20,000
E. M. Laird Airplane Co.	LC-RW-300	377	14,250	OBL	3	Pwj	300	.....	78	600	.....	114	190	.....	150	.....	58	1,600	22,000
E. M. Laird Airplane Co.	LC-RW-450	2-346	21,000	OBL	2	Pww	450	5,000	104	600	30.0	114	190	5,000	155	5,000	60	2,500	25,000
Lambert Aircraft Corp.	Monoprep	Pdg	2,955	OML	2	Lam	90	S.L.	25	590	5.0	78	120	S.L.	105	S.L.	40	900	16,200
Lambert Aircraft Corp.	Monosport	Pdg	3,460	CML	2	Lam	90	S.L.	25	590	5.0	78	130	S.L.	115	S.L.	40	1,000	17,000
Lambert Aircraft Corp.	Monocoupe 90A	*306	3,825	CML	2	Lam	90	S.L.	28	600	5.0	78	130	S.L.	110	S.L.	40	850	16,000
Lockheed Aircraft Corp.	Altair 8E	.....	.....	CML	2	Pww	550	5,000	175	1,150	28.5	108	220	5,000	205	11,000	.....	1,400	22,000
Luscombe Airplane Development Corp.	Phantom I	*552	.....	CML	2	War	145	.....	33	560	.....	87	163	.....	140	.....	45	1,400	19,000
McGaffey Airplane Development Co.	Aviate	.....	2,490	CML	2	Ford V8	100	.....	15	500	3.0	.....	115	.....	100	.....	.....	.....	.....
National Airplane & Motor Co.	Bluebird	Pdg	995	OML	2	Nat	35	4,000	8.5	300	2.25	.....	87	4,000	82	4,000	32	495	14,000
Northrop Corp.	Gamma	*549	.....	CML	2	Wr Cy	750	11,000	334[4]	1,760	42.0	120	228	11,000	222	16,500	62	1,100	25,000
Pasped Aircraft Corp.	Skylark I	Pdg	.....	OML	2	War	125	.....	31	545	6.0	96	140	.....	125	.....	35	890	19,000
Porterfield Aircraft Corp.	35-70	567	1,895	CML	2	Lb[7]	70	S.L.	18	350	4.5	78	115	700	105	700	40	600	16,000
Wiley Post Aircraft Corp.	A	561	1,438	OBL	2	Post	40	S.L.	7.5	140	3.5	76	82	S.L.	70	S.L.	27	600	10,000
Rearwin Airplanes, Inc.	2,000C	232	.....	OBL	2	Cu	185	S.L.	55	500	12.0	102	140	800	120	800	.....	1,000	22,000
Rearwin Airplanes, Inc.	6,000	.....	3,295	CML	2	Cir	95	S.L.	34	680	6.0	78	144	800	122	800	48	750	16,000
Rearwin Airplanes, Inc.	7,000	574	2,095	CML	2	Lb	70	S.L.	24	475	4.75	81	115	800	100	800	46	625	15,000
Rearwin Airplanes, Inc.	8,500	591	2,370	CML	2	Lb	85	S.L.	24	475	5.0	81	118	800	103	800	46	700	15,200
Rose Airplane Corp.	Parrakeet A-1	Pdg	975	OBL	1	Con[12]	37	2,550	10	340	2.5	52	100	.....	85	.....	27	750	12,000
Ryan Aeronautical Co.	S-T-A	571	4,385	OML	2	Men	125	S.L.	24	400	7.5	76	150	S.L.	128	1,200	40	1,200	17,500
Ryan Aeronautical Co.	S-T	541	3,955	OML	2	Men	95	S.L.	24	400	7.0	76	140	S.L.	120	1,200	40	850	14,000
Security National Aircraft Corp.	SI-A	*521	2,495	OML	2	Se	125	S.L.	25	300	8.0	96	125	S.L.	100	S.L.	45	1,200	14,000
Skylark Aircraft Corp.	3	*303	1,995	OBL	2	Rov	95	.....	22	300	5.0	84	105	.....	85	.....	45	650	.....
Stearman Aircraft Co.	73B1	.....	.....	OBL	2	Wr Ww	235	S.L.	43	379	12.6	102	130	S.L.	110	S.L.	48	928	16,000
Stearman Aircraft Co.	75	.....	.....	OBL	2	Ly	215	S.L.	48	412	12.0	105	125	S.L.	103	S.L.	50	780	14,000
Stearman Aircraft Co.	76	.....	.....	OBL	2	Wr Ww[3]	420	S.L.	70	390	26.4	102	165	S.L.	148	S.L.	54	1,200	21,000
Swallow Airplane Co.	C	Pdg	3,585	CML	2	Men	125	.....	30	450	7.0	84	130	S.L.	118	.....	41	650	18,000
Taylor Aircraft Co.	New Cub J2	595	1,470	CML	2	Con	37	S.L.	9	210	2.5	.....	87	S.L.	70	S.L.	.....	450	12,000
C. G. Taylor	A	.....	1,500	CML	2	.....	37	S.L.	10	230	3.0	69	87	S.L.	78	S.L.	38	400	14,000
Viking Flying Boat Co.	Kittyhawk B8	*392	4,250	OBL	3	K	125	.....	35	420	7.0	98	110	.....	90	.....	44	750	14,500
Waco Aircraft Co.	DPF	583	8,775	OBL	3	Wr Ww	285	S.L.	73.5	575	18.0	.....	159	S.L.	149	6,000	48	1,250	20,000
Waco Aircraft Co.	S3-HD	543	16,100	OBL	2	Pwj	400	S.L.	90	650	24.0	105	195	S.L.	166	S.L.	60	1,750	21,000
Waco Aircraft Co.	UPF	Pdg	7,175	OBL	3	Con	225	S.L.	50	475	13.0	.....	146	S.L.	128	S.L.	48	1,000	17,000
Waco Aircraft Co.	YPF	586	7,095	OBL	3	Ja	225	S.L.	50	450	14.0	.....	150	S.L.	132	S.L.	48	1,150	18,000
Waco Aircraft Co.	ZPF	586	7,635	OBL	3	Ja	285	S.L.	61	475	18.0	.....	159	S.L.	140	S.L.	48	1,250	19,500
Orin Welch Aviation School	OW5M	474	1,195	OML	2	Con	37	S.L.	10	300	3.0	60	96	S.L.	85	S.L.	39	450	11,000
Orin Welch Aviation School	OW7M	474	1,085	OML	2	Welch	45	S.L.	10	300	3.0	60	96	S.L.	85	S.L.	39	450	11,000

A —Amphibian
Acp —Aircraft Prod
AD —Alclad
Aer —Aerol
Al —Aluminum
Apl —Applied for
Aut —Autofan
Aw —Air Wheels
B —Biplane
Bo —Bolted
Box —Box spar
Bx —Bendix
C —Closed
Cir —Cirrus
Con —Continental
Cu —Curtiss Challenger
Cy —Cyclone
D —Aluminum alloy
E.H. —Ebert Hatch
F —Flying boat
Fab —Fabric
Fx —Fixed
G —Glued
Gen —General
Go —Goodyear
Ha —Hayes
Hyd —Hydraulic
I —"I" section
Id —Inverted
Ja —Jacobs
K —Kinner
L —Landplane
Lam —Lambert
Lmd —Laminated
Lp —Low pressure
Ly —Lycoming
M —Monoplane
Me —Metal
Mech —Mechanical
Men —Menasco
Mo —Monocoque
Nat —National
O —Open
Ol —Oleo
Op —Optional
Ply —Plywood
Pn —Pneumatic
Pob —Pobjoy
Pwh —P & W Hornet
Pwj —P & W Wasp, Jr.
Pww —P & W Wasp
Q —Sesquiplane
Re —Retractable
Ro —Routed

American Airplanes

sponsibility for figures given

Weights				Dimensions			Areas (Sq.Ft.)						Wings			Landing Gear						Fuselage or Hull†
Wing loading (lb. per sq.ft.)	Power loading (lb. per hp.)	Weight empty	Gross weight (lb.)	Span	Length Overall	Height Overall	Wing (including Ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Spars	Ribs	Covering Material	Type	Tread (in.)	Wheel type & size	Brakes (type & make)	Landing gear shock unit (type & make)	Tail unit	
Single Engined Planes with Seats for One, Two, or Three Persons																						
7.66	25.10	569	1,006	36′	20′	7′6″	142.2	15.7	6.72	9.3	14.88	12.32	Sol,Sp	Sp	Fab	Fx	54	.....[1]	.....	Ol	Sk	ST,Wl,Fab
11.20	24.00	1,025	1,680	36′	22′6″	7′	150.0	15.6	6.4	8.2	13.0	8.5	Sp,Box	Sp	Fab	Fx	76	Aw 700x5	Ha	Ol	Wh	ST,Wl,Fab
11.20	19.75	1,015	1,680	36′	22′6″	7′	150.0	15.6	6.4	8.2	13.0	8.5	Sp,Box	Sp	Fab	Fx	76	Aw 700x5	Ha	Ol	Wh	ST,Wl,Fab
11.50	26.00	573	962	37′9½″	21′9″	5′8″	175.0	20.0	6.5	7.4	18.8	13.0	Lmd,Sp	W	Fab	Fx	.....	Go 16x7.3	.....	None	Sk	ST,Wl,Fab
11.60	21.80	590	982	37′9½″	21′7″	5′8″	175.0	20.0	6.5	7.4	18.8	13.0	Lmd,Sp	W	Fab	Fx	.....	Go 16x7.3	.....	None	Sk	ST,Wl,Fab
7.85	15.70	1,651	2,588	36′8″	25′7″	9′10″	330.0	43.0	4.25	10.2	23.8	16.8	Sp	W	Fab	Fx	.....	Bx 30x5	Bx	Se	Sk	ST,Wl,Fab
10.12	16.5	1,020	1,650	32′	24′	7′	163.0	16.2	2.5	7.0	17.0	13.5	Box	W	Fab	Fx	.....	Aut	Aut	Se	.....	ST,Wl,Fab
4.79	20.50	509	922	34′4″	21′7¼″	8′	164.4	17.84	4.35	6.62	12.96	12.07	Sol,Sp	Sp	Fab	Fx	65	Aw 700x4	.....	Se	Sk	ST,Wl,Fab
17.6	10.6	1,850	2,650	32′	26′	8′	150.0	.....	.....	.....	.....	.....	Sol,Sp	W	Fab	Fx	.....	Aw 22″	Go	None	Wh	ST,Wl,Fab
12.18	14.40	1,360	2,088	35′	25′3½″	7′2″	173.0	11.9	5.5	4.5	18.0	10.0	Rv,D	D	D	Re[8]	84	Go Aw	Hyd	Ol	Wh	D,Mo,D
8.40	12.30	1,357	2,150	28′10″	21′1″	8′10″	206.0	17.6	5.0	7.7	18.5	12.7	Sol,Sp	Sp	Fab	Fx	76	Aw 16.5x10	Acp	Ol	Wh	ST,Wl,Fab
11.60	11.50	1,772	2,870	31′	23′7″	9′10″	248.0	21.5	5.4	10.4	19.1	11.9	Sol,Sp	Sp	Fab	Fx	81	8.5x10	Acp	Ol	Wh	ST,Wl,Fab
12.40	9.30	2,008	3,067	31′	23′7″	9′10″	248.0	21.5	5.4	10.4	19.1	11.9	Sol,Sp	Sp	Fab	Fx	81	8.5x10	Acp	Ol	Wh	ST,Wl,Fab
12.40	7.30	2,110	3,067	31′	23′2″	9′2″	248.0	21.5	5.4	10.4	19.1	11.0	Sol,Sp	Sp	Fab	Fx	96	8.5x10	Acp	Ol	Wh	ST,Wl,Fab
11.20	14.50	1,284	2,100	33′3⅜″	22′3″	7′11″	173.0	16.34	4.1	9.4	15.8	10.4	Ro I,Sp	Sp	Fab	Fx	95	6.50x10	War	Ol,Spr	Wh	S,Wl,Fab,Al
9.85	16.55	1,413	2,400	36′4″	23′9″	7′3½″	173.16	16.34	4.1	9.4	16.34	13.47	Ro I,Sp	Sp	Fab	Fx	111	6.5x10	War	.....	Wh	ST,Wl,Fab
9.85	16.55	1,536	2,400	36′4″	24′7″	7′3½″	173.16	16.34	4.1	9.4	16.34	13.47	Ro I,Sp	Sp	Fab	Fx	111	6.5x10	War	.....	Wh	ST,Wl,Fab
11.20	10.40	3,812	7,000	34′3″	27′3″	9′3″	211.0	18.8	3.6	11.0	22.0	18.0	Sol,Sp	Ply	Ply	Fx	76	Bx 31″	Bx	Bx	Sk	ST,Wl,Fab
8.65	15.80	1,016	1,580	27′8″	20′4″	8′5″	187.6	13.5	5.9	6.8	15.4	10.7	Ro,Sp	D	Fab	Fx	70	Aw 22x10	Yes	.....	Sk	ST,Wl,Fab
12.05	14.20	1,481	2,270	32′8⅛″	24′3″	7′9″	189.0	14.94	7.2	9.75	18.6	15.6	Lmd,Sp	Sp	Fab	Fx	84	Aut 6.50x10	Yes	Ol,Spr	Wh	ST,Wl,Fab
8.25	15.00	1,272	1,875	39′	24′2″	7′	227.0	20.5	7.2	9.75	18.6	13.9	Sol,Sp	Sp	Fab	Fx	98	Go Aw	Yes	Ol,Spr	Wh	ST,Wl,Fab
8.25	10.75	1,257	1,875	39′	24′2″	7′	227.0	20.5	7.2	9.75	18.6	13.9	Sol,Sp	Sp	Fab	Fx	98	Go Aw	Yes	Ol,Spr	Wh	ST,Wl,Fab
10.00	13.50	1,397	2,170	34′5½″	24′6½″	7′2½″	199.0	18.3	7.2	9.75	18.6	13.9	Sol,Sp	Sp	Fab	Fx	84	Aut 6.50x10	Yes	Ol,Spr	Wh	ST,Wl,Fab
9.46	10.82	1,935	3,083	33′6″	24′7″	9′3″	295.0	.....	.....	13.0[11]	.....	36.0[12]	Sol,Sp	Ply	Fab	Fx	108	Sl 27″	Bx	Se	Wh	DT,Rv,Fab
9.50	10.10	1,930	3,020	33′6″	24′7″	9′3″	295.0	.....	.....	13.0[11]	.....	36.0[12]	Sol,Sp	Ply	Fab	Fx	108	Sl 27″	Bx	Se	Wh	DT,Rv,Fab
10.30	10.30	1,922	3,010	28′	22′9″	9′	202.0	.....	.....	.....	.....	.....	Sol,Sp	Ply	Fab	Fx	.....	30x5	Yes	.....	Op	DT,Rv,Fab
10.30	10.30	1,922	3,010	28′	22′9″	9′	202.0	.....	.....	.....	.....	.....	Sol,Sp	Ply	Fab	Fx	.....	30x5	Yes	.....	Op	DT,Rv,Fab
8.80	7.50	2,120	3,200	30′6″	22′8″	9′6″	216.0	.....	.....	13.0[11]	.....	36.0[12]	Sol,Sp	Ply	Fab	Fx	96	Bx 32x6	Bx	Ol	Sk	DT,Rv,Fab
9.46	17.20	922	1,550	29′6″	18′6″	7′11″	145.7	18.8	4.8	5.9	22.1	10.2	Lmd,Sp	Sp	Fab	Fx	80	Lp 6.5x10	E.H.	Ol	Sk	ST,Wl,Fab
9.46	17.20	922	1,550	29′6″	18′6″	7′11″	145.7	18.8	4.8	5.9	22.1	10.2	Lmd,Sp	Sp	Fab	Fx	80	Lp 6.5x10	E.H.	Ol	Sk	ST,Wl,Fab
11.92	17.89	967	1,610	32′	20′5¾″[8]	6′9¾″	134.5	11.55	4.1	5.76	10.6	9.2	I,Sp	W	Fab	Fx	77¼	Lp 6.5x10	E.H.	Se	Wh	ST,Wl,Fab
9.72	10.54	3,550	5,800	42′9¼⅛″	28′11″[9]	9′3″	294.1	22.4	11.0	12.8	38.0	21.6	Sp	Sp	Sp	Rs	139	Aut 27″ Sl	Aut	Aer	Wh	W,G,W
9.62	13.42	1,320	1,950	31′	21′6″	6′9″	143.0	13.42	7.02	7.29	12.85	9.05	I,D	D	Fab	Fx	72	Aut	.....	Ol	Wh	D,Rv,D
9.00	10.42	1,167	1,750	34′	23′9″	7′4½″	195.3	15.8	8.2	8.1	16 4	12.0	Sol,Sp	W	Ply	Fx	96	4.50x12	Yes	Ol,Spr	Wh	ST,Wl,D
5.20	25.70	450	925	37′	20′	8′6″	178.0	22.0	6.58	7.51	11.95	8.72	Ro,Sp	Sp	Fab	Fx	57½	Go Aw 16x7x3	.....	Se	Sk	ST,Wl,Fab
10.25	10.50	4,100	7,350	47′9½″	31′2″	9′	363.0	23.48	8.37	11.35	37.56	18.74	.....[5]	.....	D	Fx	108	36x8	Bx	Ol,Pn	Wh	D,Rv,D
9.56	14.30	1,188	1,800	35′10″	25′2″	7′11″	187.0	19.6	7.6	7.2	19.2	13.6	Lmd,Sp	Sp	Fab	Fx	96	Aut 6.50x10	Aut	Ol	Wh	ST,Wl,Fab
9.56	18.57	806	1,103	32′	20′3″	6′7″	147.0	17.16	5.16	6.33	13.2	9 55	Sol,Sp	Sp	Fab	Fx	69	Go Aw	Go	Se	Wh	ST,Wl,Fab
4.88	25.00	581	992	28′6″	19′8⅝₁₆″	7′9½″	204.0	15.74	4.334	5.905	13.8	12.2	Ro I,Sp	Sp	Fab	Fx	72	Go 16x7.3	.....	Se	Sk	ST,Wl,Fab
7.09	12.81	1,495	2,380	35′	25′	9′11″	300.0	26.5	4.83	9.13	17.6	18.4	Sp	W	D,Fab	Fx	80	Bx 28 x4	Bx or Go	Ol,Se	Op	ST,Wl,Al,Fab
11.05	16.90	992	1,605	32′2″[8]	22′2″	6′10″	145.0	13.13	5.75	5.67	17.02	9.21	Sp	Sp	D,Fab	Fx	70	Aut 7.00x5	Aut or Go	Se	Wh	ST,Wl,Al,Fab
9.50	20.14	853	1,410	35′	22′4″	6′9″	166.0	19.74	5.17	6.92	15.04	12.12	Sol,Sp	Ply	D,Fab	Fx	72	7.00x4	Bx	Ol,Spr	Sk[2]	ST,Wl,Al,Fab
8.50	16.60	830	1,410	35′	22′4″	6′9″	166.0	19.74	5.17	6.92	15.04	12.12	Sol,Sp	Ply	D,Fab	Fx	72	7.00x4	Bx	Ol,Spr	Sk[2]	ST,Wl,Al,Fab
6.28	19.60	456	728	20′	16′4″	5′8″	116.0	.....	.....	.....	.....	.....	Sp	Ply	.....	Fx	54	14x3	.....	Se	Sk	ST,Wl,Fab
12.50	16.50	1,027	1,570	29′11″	21′8″	6′11″	124 0	11.38	4.5	7.2	12.0	10.0	Sol,Sp	D	Fab	Fx	78	18x8.5	Go	Aer	Wh	Me,Rv,D
12.50	16.50	1,027	1,570	29′11″	21′11″	6′1″	124 0	11.38	4.5	7.2	12.0	10.0	Sol,Sp	D	Fab	Fx	78	Aw 18x8.5	Go	Aer	Wh	Me,Rv,D
6.75	14.20	1,150	1,775	40′	23′11″	7′9″	238.0	24.0	7.0	7.0	20.0	14.0	Ro,Sp	Sp	Fab	Fx	96	Aut 6.50x10	Aut	Ol,Se	Wh	ST,Wl,Fab
7.40	18.40	878	1,378	28′3″	21′6″	8′	186.0	19.4	3.8	7.3	13.8	10.9	Sol,Sp	D	Fab	Fx	72	E.H. 6.50x10	E.H.	Ol	Sk	ST,Wl,Fab
8.85	11.17	1,938	2,626	32′2″	25′4″	9′6″	297.15	23.10	3.2	10.38	24.24	14.52	Sol,Sp	Sp	Fab	Fx	78	Sl 24″	Bx	Aer	Wh	ST,Wl,Fab
9.00	12.50	1,970	2,688	32′2″	26′	9′5″	297.4	30.0	3.2	11.83	24.24	14.36	Sol,Sp	Sp	Fab	Fx	78	Sl 24″	Bx	Aer	Wh	ST,Wl,Fab
11.39	10.03	2,104	3,310	32′2″	25′	9′4″	297.15	23.10	3.2	10.38	24.24	14.52	Sp	Sp	Fab	Fx	78	Sl 24″	Bx	Spr,Ol	Wh	ST,W,Fab
10.50	15.80	1,350	1,950	36′8″	24′4″	7′3″	189.0	22.7	6.2	8.9	19.0	11.3	Sol,Sp	Sp	Fab	Fx	90	6.50x10	E.H.	Se	Wh	ST,W,Fab
5.46	25.50	563	970	35′2½″	22′5″	6′8″	178.5	.....	.....	.....	.....	.....	Sol,Sp	Me	Fab	Fx	72	Aw 7.00x4	.....	Se	Sk	ST,W,Fab
5.8	26.00	570	990	36′	22′	6′8″	169.0	20.0	3.5	5.7	13.0	10.9	Sol,Sp	Me	Fab	Fx	72	6.00x6	Yes	.....	.....	ST,Wl,Fab
8.37	15.60	1,178	1,950	28′4″	22′11″	8′8″	233.4	23.3	5.68	6.36	24.04	12.84	Ro,Sp	Sp	Fab	Fx	88	War 6.50x10	War	Ol	Wh	ST,Wl,Fab
10.90	9.30	1,725	2,650	30′	23′2″	8′5½″	243.0	.....	.....	.....	.....	.....	Sol,Sp	Ply	Fab	Fx	75½	Aut 7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
10.30	8.10	2,300	3,400	32′9″	25′1″	9′	256.3	.....	.....	.....	.....	.....	Sp	Ply	Fab	Fx	85	Aut 7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
10.90	12.62	1,650	2,650	30′	22′9″	8′5⅜₁₆″	243.0	.....	.....	.....	.....	.....	Sol,Sp	Ply	Fab	Fx	75½	Aut 7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
10.90	11.76	1,675	2,650	30′	22′10″	8′5½″	243.0	.....	.....	.....	.....	.....	Sol,Sp	Ply	Fab	Fx	75½	Aut 7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
10.90	9.30	1,675	2,650	30′	22′10″	8′5½″	243.0	.....	.....	.....	.....	.....	Sol,Sp	Ply	Fab	Fx	75½	Aut 7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
6.50	26.50	540	950	34′4″	21′	5′8″	136.0	18.92	4.13	9.13	14.4	11.2	Sp,Ply	W	Fab	Fx	56½	16x7	.....	None	Sk	ST,Wl,Fab
6.50	22.40	500	950	34′4″	21′	5′8″	136.0	18.92	4.13	9.13	14.4	11.2	Sp,Ply	W	Fab	Fx	56½	16x7	.....	None	Sk	ST,Wl,Fab

Rov —Rover
Ru —Rusco
Rv —Riveted
S —Steel

Sc —Shock cord
Se —Security
Sk —Skid
Sl —Streamline

Sol —Solid
Sp —Spruce
Spr —Spring
Sz —Szekely

T —Tubing
Trs —Truss
W —Wood
War —Warner

Wh —Wheel
Wl —Welded
Wr —Wright
Ww —Whirlwind

†First symbol indicates material used; second, method of fabrication; third, covering material. [1]Either 15.5 in. streamline (with or without brakes) or 16x7 airwheels without brakes. [2]Wheel extra. [3]Also available with P&W Wasp Jr. [4]403 gal. capacity available. [5]Wings of aluminum alloy, multicellular construction; no ribs or spars. [6]Also offered as Model A-942-B with Wright Cyclone engine. [7]Also offered as Model 35 with 65 hp. LeBlond engine. [8]Semi-retractable. [9]Also available with Lambert 90 hp. engine. [10]With controllable-pitch propeller. [11]Including fin. [12]Including stabilizer. [13]Also available with 50 hp. Poyer engine. [14]Also available with 360 gal. capacity. [15]Two. [16]Also 2-495. [17]Available with 2 Wright Cyclone or 2 P&W Hornets. [18]Berths. Model DC-3 seats 24 for daytime operation. [19]Also available with 2 P&W Wasps. [20]Semi-monocoque. [21]Wingless type. [22]Disc loading. [23]Rotor diameter. [24]With rotor folded. [25]Structural details given apply to rotor blades. [26]Supercharged optional. [27]Center section D I-beam, tips spruce box spar. [28]Riveted and bolted. [29]Disc area. *Licensed as seaplane.

Specifications

AVIATION does not

Manufacturer	Designation or Model No.	A.T.C. number	Price at factory	Type	Number of seats	Make of engine	Total rated hp.	At altitude, ft.	Fuel capacity (gal.)	Normal range (mi.)	Fuel consumption at cruising speed (gal. per hr.)	Propeller Diameter—in.	High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft.p.m.)
Single-Engined Planes with Seats for Four or More Persons																		
Airplane Development Corp.	Vultee V-1A	545	.....	CML	10	Wr Cy	735	4,100	206	1,000	45.0	120	225	4,100	205	7,000	63	1,000
Beech Aircraft Co.	B-17-B	Pdg	9,250	CBL	4	Ja	285	.....	70	700	.....	.....	177	7,200	.....	.....	.....	1,200
Beech Aircraft Co.	B-17-L	*560	8,550	CBL	4	Ja	225	.....	50	550	14.0	90	175	7,200	166	7,200	.....	1,000
Beech Aircraft Co.	B-17-R	579	14,500	CBL	4	Wr Ww	420	.....	95	700	.....	.....	202	9,000	.....	.....	.....	1,600
Bellanca Aircraft Corp.	Aircruiser Cargo	*563	35,800	CQL	15	Wr Cy	715	3,900	300	610	42.0	150	165	7,000	155	12,000	64	700
Bellanca Aircraft Corp.	Sr. Pacemaker	*578	19,975	CML	6	Wr Ww	420	S.L.	200	860	25.2	108	160	S.L.	145	S.L.	64	700
Bellanca Aircraft Corp.	Sr. Pacemaker Freighter	*578	19,700	CML	8	Wr Ww	420	S.L.	200	860	25.2	108	160	S.L.	145	S.L.	64	700
Bellanca Aircraft Corp.	Sr. Skyrocket	565	22,700	CML	6	Pww	550	5,000	200	600	36.3	108	190	5,000	180	12,000	64	1,240
Cessna Aircraft Co.	C-34	573	4,985	CML	4	Wa	145	S.L.	35	550	9.5	....	162	S.L.	143	S.L.	47	1,000
Fairchild Aircraft Corp.	C-31	.....	.....	CML	16	Wr Cy	750	2,500	220	665	39.6	150	157	2,500	140	S.L.	54	.....
Fairchild Aircraft Corp.	F-45	Pdg	.....	CML	5	Wr Ww	320	S.L.	90	675	22.0	102	171	S.L.	165	5,250	54	900
Kinner Airp. & Motor Corp., Ltd.	Envoy	532	.....	CML	4	K	370	5,000	102	700	24.75	108	185	5,000	164	5,000	55	1,200[10]
Lockheed Aircraft Corp.	Orion 9D	514	.....	CML	6	Pww	550	5,000	116	720	33.0	108	225	5,000	205	8,500	....	1,400
Lockheed Aircraft Corp.	Vega 5C	*384	.....	CML	7	Pww	450	6,000	96	660	27.0	108	190	6,000	180	11,000	....	1,300
Northrop Corp.	Delta	553	.....	CML	8	Wr Cy	710	7,000	328	1,650	43.0	120	221	7,000	206	15,000	62	1,180
Stinson Aircraft Corp.	SR-7A	.....	6,485	CML	4	Ly	225	S.L.	50	400	15.0	102	....	.....	138.5	5,000	51	715
Stinson Aircraft Corp.	SR-7B	.....	7,485	CML	4	Ly	245	S.L.	70	560	15.0	99	....	.....	141	5,000	52	850
Waco Aircraft Co.	DQC	Pdg	8,975	CBL	5	Wr Ww	285	S.L.	70	550	20.0	....	168	S.L.	159	6,000	57	850
Waco Aircraft Co.	EQC	Pdg	9,650	CBL	5	Wr Ww	320	S.L.	70	600	20.0	....	173	S.L.	170	6,000	57	1,000
Waco Aircraft Co.	UQC	Pdg	7,375	CBL	5	Con	225	S.L.	70	650	13.0	....	155	S.L.	136	S.L.	55	710
Waco Aircraft Co.	YKS	*533	4,995	CBL	5	Ja	225	S.L.	50	450	14.0	....	144	S.L.	131	S.L.	54	800
Waco Aircraft Co.	YQC	Pdg	7,295	CBL	5	Ja	225	S.L.	70	600	14.0	....	159	S.L.	140	S.L.	55	760
Waco Aircraft Co.	ZQC	Pdg	7,835	CBL	5	Ja	285	S.L.	70	560	18.0	....	168	S.L.	149	S.L.	57	850
Multi-Engined Transport Planes																		
Boeing Aircraft Co.	247-D	558	.....	CML	12	2 Pww	1,100	8,090	273	745	66.0	120	200	8,000	180	8,000	62	1,150
Burnelli Aircraft, Ltd.	UB-14	.....	50,000	CML	14	2 Pwh	1,500	7,000	300	600	108.0	....	225	6,000	185	6,000	63	1,250
Crusader Aircraft Corp.	AG-7	.....	.....	CML	7	2 Men	500	5,000	120	720	.....	....	210	5,000	180	5,000	....	1,000
Curtiss-Wright Airplane Co.	Condor T-32	534	.....	CBL	18	2 Wr Cy	1,430	7,000	350	650	.....	....	190	8,000	167	8,000	....	1,200
Curtiss-Wright Airplane Co.	Condor Seaplane AT-32	534	.....	CBL	18	2 Wr Cy	1,430	7,000	350	650	.....	....	190	8,000	167	8,000	....	1,200
Curtiss-Wright Airplane Co.	Condor CT-32	.....	.....	CBL	2	2 Wr Cy	1,500	S.L.	350	750	90.0	138	180	.....	160	.....	63	1,000
Douglas Aircraft Co., Inc.	DC-2	540[16]	.....	CML	16	.....[17]	1,420	7,000	510	1,225	80.0	132	210	8,100	196	12,500	60	1,090
Douglas Aircraft Co., Inc.	DST	.....	.....	CML	16[18]	2 Wr Cy[19]	1,700	4,300	820	1,790	.....	.....	212	4,300	184	10,000	....	970
Kinner Airp. & Motor Corp., Ltd.	Invader	.....	.....	CML	6	2K	740	5,000	240[14]	900	49.5	108	210	5,000	190	5,000	70	1,255
Lockheed Aircraft Corp.	Electra 10A	551	.....	CML	12	2 Pwj	900	2,300	194	810	42.0	108	210	5,000	195	9,600	....	1,100
Lockheed Aircraft Corp.	Electra 10B	584	.....	CML	12	2 Wr Ww	880	S.L.	200	800	42.0	108	200	S.L.	186	7,000	....	1,230
Lockheed Aircraft Corp.	Electra 10E	595	.....	CML	12	2 Pww	1,100	5,000	250	830	56.0	108	215	10,500	205	9,600	....	1,200
Lockheed Aircraft Corp.	12	.....	.....	CML	8	2 Pwj	800	5,000	150	565	42.0	108	226	5,000	206	9,600	....	1,400
Stinson Aircraft Corp.	A	.....	.....	CML	10	3 Ly	780	S.L.	160	640	43.5	99	180	.....	165	5,000	70	1,000
Stinson Aircraft Corp.	B	.....	.....	CML	6	2 Ly	520	S.L.	150	900	29.0	....	....	.....	160	6,000	....	1,150
Amphibians and Flying Boats																		
Argonaut Aircraft, Inc.	Pirate	Pdg	4,975	CMA	3	Men[26]	125	1,000	40	500	7.0	72	100	S.L.	89	.....	40	700
Fairchild Aircraft Corp.	A-942-A	587	.....	CMA	10	Pwh[6]	750	2,500	180	660	39.0	138	173	2,500	162	16,000	61	975
Glenn L. Martin Co.	130	585	.....	CMF	46	4 Pww	3,320	6,000	4,000	3,200	123.0	138	180	8,000	130	10,000	65	557
Sikorsky Aircraft	S-42-A	.....	.....	CMF	37	4 Pwh	3,000	7,000	1,240	1,200	168.0	138	190	7,000	165	7,000	65	800
Sikorsky Aircraft	S-43	.....	.....	CMA	18	2 Pwh	1,500	7,000	400	800	.....	138	194	7,000	169	7,000	64	1,100
Autogiros																		
Autogiro Company of America	A.C. 35	.....	.....	CL	2	Pob	90	.....	11	340	3.5	....	115	1,000	100	1,000	16	.....
Kellett Autogiro Corp.	KD-1[21]	.....	.....	OL	2	Ja	225	S.L.	49	361	15.0	102	125	S.L.	103	S.L.	10	1,400

A —Amphibian
Acp —Aircraft Prod
AD —Alclad
Aer —Aerol
Al —Aluminum
Apl —Applied for
Aut —Autofan
Aw —Air Wheels
B —Biplane
Bo —Bolted
Box —Box spar
Bx —Bendix
C —Closed
Cir —Cirrus
Con —Continental
Cu —Curtiss Challenger
Cy —Cyclone
D —Aluminum alloy
E.H. —Ebert Hatch
F —Flying boat
Fab —Fabric
Fx —Fixed
G —Glued
Gen —General
Go —Goodyear
Ha —Hayes
Hyd —Hydraulic
I —"I" section
Id —Inverted
Ja —Jacobs
K —Kinner
L —Landpl
Lam —Lambert
Lmd —Laminat
Lp —Low pr
Ly —Lycomi

†First symbol indicates material used; second, method of fabrication; third, covering material. [1]Either 15.5 in. streamline (with or without brakes) or 16x7 airwheels with brakes. [2]Wheel extra. [3]Also available with P&W Wasp Jr. [4]403 gal. capacity available. [5]Wings of aluminum alloy, multicellular construction; no ribs or spars. [6]Also offered Model A-942-B with Wright Cyclone engine. [7]Also offered as Model 35 with 65 hp. LeBlond engine. [8]Semi-retractable. [9]Also available with Lambert 90 hp. engine. [10]With trollable-pitch propeller. [11]Including fin. [12]Including stabilizer. [13]Also available with 50 hp. Poyer engine. [14]Also available with 360 gal. capacity. [15]Two. [16]Also

nerican Airplanes

...bility for figures given

Climb at sea level (ft.p.m.)	Power loading (lb. per hp.)	Weights: Weight empty	Weights: Gross weight (lb.)	Dimensions: Span	Dimensions: Length Overall	Dimensions: Height Overall	Areas (Sq. Ft.): Wing (including aileron)	Areas (Sq. Ft.): Ailerons (total)	Areas (Sq. Ft.): Fin	Areas (Sq. Ft.): Rudder	Areas (Sq. Ft.): Stabilizer	Areas (Sq. Ft.): Elevators (total)	Wings: Spars	Wings: Ribs	Wings: Covering Material	Landing Gear: Type	Landing Gear: Tread (in.)	Landing Gear: Wheel type and size	Landing Gear: Brakes (type and make)	Landing Gear: Landing gear shock unit (type and make)	Landing Gear: Tail Unit	Fuselage or Hull†
Single-Engined Planes with Seats for Four or More Persons																						
1,000	11.55	5,307	8,500	50′	37′	10′2″	384	23	10	14	39	32.50	Trs	AD	AD	Re	145	Aw 30x13	Go	Ol	Wh	AD,Rv,AD
1,200	11.25	1,850	3,150	32′	24′5″	8′6″	273	24	6	15	24	15.07	.....	.....	.....	Re	86	7.50x10	.....	.....	Wh	.....
1,000	14.00	1,800	2,943	32′	24′5″	8′6″	273	24	6	9	24	15.07	Sol,Sp	Sp	Fab	Re	86	7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
1,600	11.50	2,200	3,600	32′	24′5″	8′2″	267	24	6	9	24	15.07	.....	.....	.....	Re	86	7.50x10	.....	.....	Wh	.....
700	15.90	6,115	11,400	65′	42′9″	11′6½″	664	46	21	21	60	30.00	Ro,Sp	S	Fab	Fx	216	Go Aw 36x16	Go	Ol	Wh	ST,Wl,Fab
700	15.30	3,250	5,600	50′6″	27′11″	8′6″	359	40	16	12	39	23.40	Ro,Sp	S,Ply	Fab	Fx	96½	Gen Sl 31″	Bx	Ol	Wh	ST,Wl,Fab
700	15.30	2,950	5,600	50′6″	27′11″	8′6″	359	40	16	12	39	23.40	Ro,Sp	S,Ply	Fab	Fx	96½	Gen Sl 31″	Bx	Ol	Wh	ST,Wl,Fab
1,240	10.20	3,440	5,600	50′6″	27′11″	8′6″	359	40	16	12	39	23.40	Ro,Sp	S,Ply	Fab	Fx	96½	Gen Sl 31″	Bx	Ol	Wh	ST, Wl, Fab
1,000	15.30	1,300	2,220	33′10″	24′10″	7′3″	180	12	5	6	16	12.28	Lmd,Sp	Sp,Ply	Fab	Fx	70	Aut 21″	Aut	Spr,Ol	Wh	ST, Wl,Fab
.....	16.55	7,322	12,400	75′	55′5″	15′6″	802	88	27	29	74	58.20	Rv,D	D	Fab	Re	176	Bx,Sl	Bx	Bx,Pn,Ol	Wh	ST,Wl,Fab
900	12.50	2,425	4,000	39′6″	30′1″	8′2″	248	23	6	14	20	19.80	Sp,D[27]	Sp,D	Fab	Re	111	Aut 8.5x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
1,200[16]	11.62	2,850	4,300	39′9″	28′7″	8′8″	229	22	7	12	22	17.30	Sol,Sp	Sp	Fab	Fx	90½	Aut	Yes	Ol,Spr	Wh	ST,Wl,Fab
1,400	10.54	3,640	5,800	42′9¼″	28′4″	9′8″	294	22	11	13	38	21.60	Sp,Ply	Sp,Ply	Sp,Ply	Re	139	War 9.5x12	Aut	Aer	Wh	SpPly,G,Sp,Ply
1,300	10.55	2,850	4,750	41′	27′6″	9′	279	22	13	10	32	16.00	Sp,Box	Sp	Sp	Fx	99½	War 9.5x12	War	Ol	Wh	Sp,G,Sp
1,180	10.35	4,600	7,350	47′9½″	33′1″	10′1″	363	23	8	11	38	18.72	.....[5]	.....	D	Fx	108	36x8	Bx	Ol,Pn	Wh	D,Rv,Mo,D
715	15.00	2,260	3,375	41′7¼″	26′8¾₁₆″	8′6″	256	22	11	14	24	19.20	Wl,ST	D	Fab	Fx	113	Aw 8.50x10	Go	Aer	Wh	ST,Wl,Fab
710	14.70	2,310	3,600	41′7¼″	26′8¾₁₆″	8′6″	256	22	11	14	24	19.20	Wl,ST	D	Fab	Fx	113	Aw 8.50x10	Go	Aer	Wh	ST,Wl,Fab
850	12.28	2,160	3,500	35′	26′2″	8′7½″	244	.....	.....	.....	.....	.....	Sol,Sp	Sp,Ply	Fab	Fx	87	Aut 8.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
1,000	10.94	2,160	3,500	35′	26′2″	8′7½″	244	.....	.....	.....	.....	.....	Sol,Sp	Sp,Ply	Fab	Fx	87	Aut 8.50x10	Aut	Ol,Spr	Wh	S Fl,W,Fab
1,200	14.90	2,028	3,350	35′	26′2½″	8′7½″	244	.....	.....	.....	.....	.....	Sol,Sp	Sp,Ply	Fab	Fx	87	Aut 8.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
800	14.44	1,798	3,250	33′2⅝″	25′4¾″	8′6″	240	.....	.....	.....	.....	.....	Sol,Sp	Sp,Ply	Fab	Fx	85	Aut 7.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
760	14.90	2,050	3,350	35′	26′8½″	8′7½″	244	.....	.....	.....	.....	.....	Sol,Sp	Sp,Ply	Fab	Fx	87	Aut 8.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
850	12.28	2,050	3,500	35′	26′8½″	8′7½″	244	.....	.....	.....	.....	.....	Sol,Sp	Sp,Ply	Fab	Fx	87	Aut 8.50x10	Aut	Ol,Spr	Wh	ST,Wl,Fab
Multi-Engined Transport Planes																						
1,150	12.40	8,940	13,650	74′	51′7″	12′2″	836	61	18	28	83	47.66	D,S[28]	D	D	Re	207	War 16″	War	Ol	Wh	D,Rv,D
1,250	9.65	8,000	14,000	71′	44′	10′	686	55	13[15]	22[15]	62	47.50	Rv,D	D	D	Re	126	Aut	Aut	Aer,Ol	Wh	D,Rv,D
1,000	.....	3,597	6,000	46′	27′6″	9′3½″	350	.....	.....	.....	.....	.....	Me	Me	Me	Re	150	31″ Sl	Hyd	Ol,Spr	Wh	Me,Rv,Me
1,200	12.20	11,465	17,500	82′	49′6″	16′4″	1,208	139	29	43	101	82.60	Trs,ST	D	Fab	Re	243	Bx 15x16	Mech	Ol,Spr	Wh	ST,Wl,Fab
1,200	12.20	12,235	17,500	82′	49′6″	16′4″	1,208	139	29	43	101	82.60	Trs,ST	D	Fab	Re	243	Bx 15x16	Mech	Ol,Spr	Wh	ST,Wl,Fab
1,000	12.40	11,762	18,500	82′	49′7″	16′7½″	1,276	104	29	43	101	82.60	Wl,ST	D	Fab	Re	243	Lp 15x16	Bx	Ol	Wh	ST,Wl,Fab
1,090	12.80	12,000	18,200	85′	62′	21′1″	939	87	23	43	42	58.60	Rv,AD	AD	AD	Re	216	Bx 42x15.00x10	Bx	Bx	Wh	D,Rv,AD
970	.....	15,750	24,000	95′	65′	16′4″	987	.....	.....	.....	.....	.....	AD	.....	D	Re	216	.....	.....	Ol	Wh	AD,Mo,AD
1,255	11.50	5,320	8,500	50′	33′9½″	10′6¾″	396	24	15	20	39	30.50	Sp,Box	Sp	Ply,Fab	Re	159	Gen 36″	Hyd	Aer	Wh	ST,Wl,Fab
1,100	12.62	6,325	10,100	55′	38′7″	10′1″	458	29	18	20	54	34.50	Rv,Me	Me	AD	Re	163	Go Aw 35x15-6	Go	Aer	Wh	Me,Rv,Me
1,230	11.36	6,300	10,000	55′	38′7″	10′1″	458	29	18	20	54	34.50	Rv,Me	Me	AD	Re	163	Go Aw 35x15-6	Go	Aer	Wh	Me,Rv,Me
1,200	11.67	7,100	10,500	55′	38′7″	10′1″	458	29	18	20	54	34.50	Rv,Me	Me	AD	Re	163	Go Aw 35x15-6	Go	Aer	Wh	Me,Rv,Me
1,400	8.81	5,355	7,925	49′6″	36′4″	9′9″	352	.....	.....	.....	.....	.....	Me	Me	.....	Re	162	Gen Sl 31″	Hyd	Aer	Wh	Me,Rv,Me
1,000	13.10	7,200	10,200	60′	36′10″	12′9″	500	54	.....	.....	.....	.....	Wl,ST	DT	Fab	Re	204	Aw 35x15-6	Yes	Aer	Wh	ST,Wl,Fab
1,150	12.70	4,500	6,600	52′6″	31′8″	9′4″	357	.....	.....	.....	.....	.....	Wl,Me	Me	Me, Fab	Re	156	.....	.....	.....	.....	Me,Wl,Fab
Amphibians and Flying Boats																						
700	17.60	1,350	2,225	35′2″	24′8″	8′2″	185	22	11	12	21	17.50	Sol,Sp	Sp	Fab	Re	66	Go Aw 19x9x3	Go	Ru	Wh	W,Mo,Fab
975	12.92	6,500	9,700	56′	46′8⅜″	16′3″	483	39	19	24	44	33.30	Rv,D	D	D,Fab	Re	138	Go 30x13-6	Go	Pn	Wh	D,Rv,D
557	15.57	24,611	51,000	130′	90′7″	24′7″	2,315	205	94	59	204	152.20	Rv,D	D	D,Fab	.....	.....	.....	.....	.....	.....	D,Rv,D
800	13.35	23,200	40,000	118′2″	68′	21′5″	1,340	98	73	62	146	70.00	Trs,D	D	D,Fab	.....	.....	.....	.....	.....	.....	D,Mo,[29]D
1,100	12.70	12,570	19,000	86′	51′2″	17′8″	781	53	35	37	86	41.66	Box,D	D	D,Fab	Re	134	Aut 46x17	Hyd	Ol	Wh	D,Mo,[29]D
Autogiros																						
.....	.....	.....	1,350	34′[23]	20′7″	8′2″	908	.....	.....	.....	.....	.....	ST[25]	.....	Fab	Fx	70	7.00x5.00	Mech	Ol	Wh	ST,Wl,Fab
1,400	[21]	9.20	1,375	2,075	40′[23]	20′7″[24]	10′10″[24]	.....	.....	12	.....	22	.....	ST[25]	Ply	Ply	Re	114	Aut 7x5	Aut	Aer	Wh	ST,Wl,Fab

—Landplane
—Metal
—Lambert
—Laminated
—Menasco
—Low pressure
—Lycoming

—Monoplane
—Metal
—Mechanical
—Menasco
—Optional
—Monocoque
—Nailed

Nat —National
O —Open
Ol —Oleo
Op —Optional
Ply —Plywood
Pn —Pneumatic

Pob —Pobjoy
Pwh —P & W Hornet
Pwj —P & W Wasp, Jr.
Pww —P & W Wasp
Q —Sesquiplane

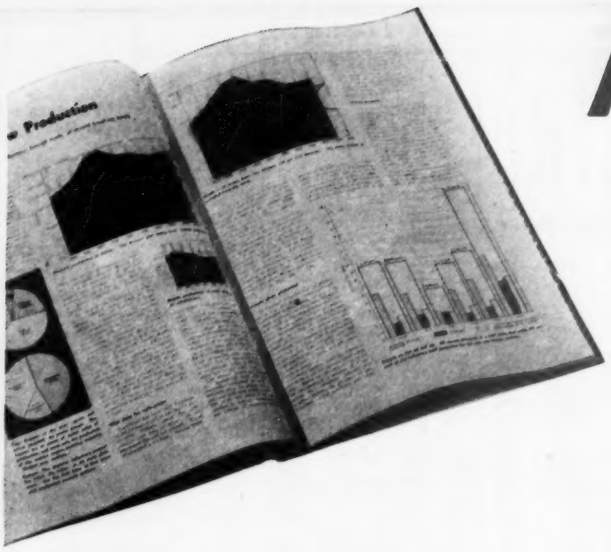
Re —Retractable
Ro —Routed
Rov —Rover
Ru —Rusco
Rv —Riveted

S —Steel
Sc —Shock cord
Sk —Skid
Sl —Streamline
Sol —Solid

Sp —Spruce
Spr —Spring
Sz —Szekely
T —Tubing
Trs —Truss

W —Wood
War —Warner
Wh —Wheel
Wl —Welded
Wr —Wright
Ww —Whirlwind

...available with 2 Wright Cyclones or 2 P&W Hornets. [18]Berths. Model DC-3 seats 24 for daytime operation. [19]Also available with 2 P&W Wasps. [20]Semi-monocoque. [21]Wing-...type. [22]Disc loading. [23]Rotor diameter. [24]With rotor folded. [25]Structural details given apply to rotor blades. [26]Supercharged optional. [27]Center section D I-beam, tips ...box spar. [28]Riveted and bolted. [29]Disc area.



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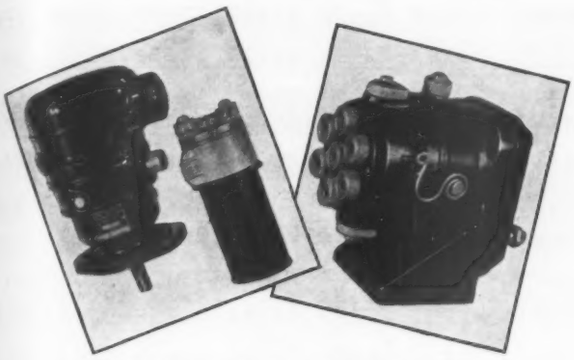
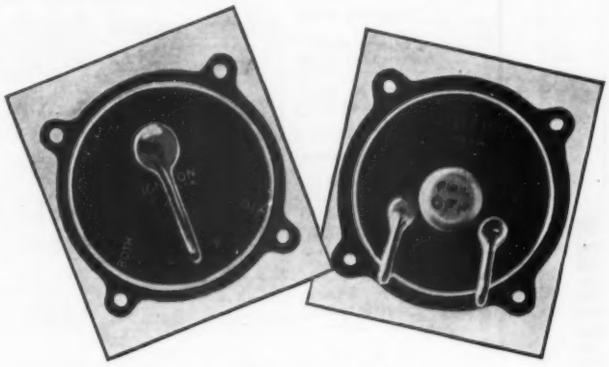
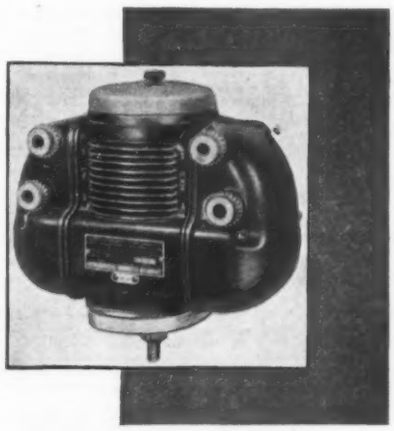


Aircraft battery ignition for most current production aircraft engines.



Ignition switches for every aircraft need.



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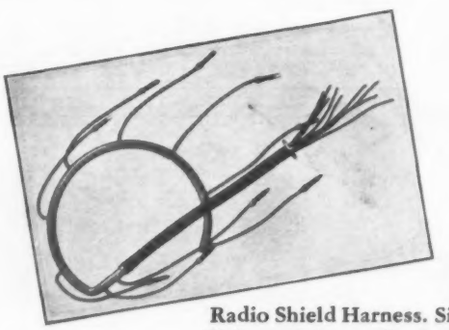
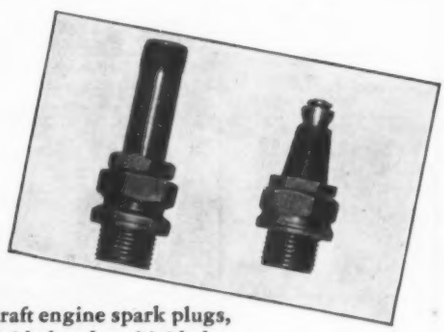
EVERY AIRCRAFT ENGINE



Radio Shield Harness. Simple, light weight, easily installed.



Aircraft engine spark plugs, shielded and unshielded.

Full information on request

SCINTILLA MAGNETO CO., INC.

(Subsidiary of Bendix Aviation Corporation)

SIDNEY, N. Y.

American Engine Specifications

AVIATION does not assume responsibility for the figures given

Manufacturer	Model	Cooling System	Number of Cylinders	Cylinder Arrangement	Propeller Drive	Rating: Rated Hp.	Rating: At R.P.M.	Rating: At Altitude (ft.)	Rating: Octane Fuel	Weights: Total dry without hub or starter	Weights: lb. per hp.	Bore and stroke (in.)	Displacement (cu. in.)	Compression Ratio	B.M.E.P.	Blower Ratio	Dimensions: Diam. Mount. Ring or distance between bearers	Dimensions: Ht. or O.D. (in.)	Dimensions: Length without starter	Guaranteed fuel consumption at rated hp. (lb. per hp.-hr.)	Oil Consumption (lb. per hp.-hr.)	Valve* Mechanism	Cylinder Construction (See footnote)	Make spark plugs supplied with engine	Type Ignition	Make Ignition	Make of Carburetors	Make of Starter	Are exhaust manifolds provided	Shipping weight crated (lb.)	D. of C. License Number
Aeronautical Corp. of America	E-113C	A	2	HOpp	D	36	2400	S.L.	....	....	....	4¼x4	113.5	5.4	....	....	....	18	24	.55	....	prr	D,S	Op	M	....	....	....	....	....	71
Aviation Holding Co. (Szekely)	SR3-O	A	3	R	D	45	1750	....	....	137	3.3	4⅛x4¾	190	4.6	....	....	....	36	25	.60	.016	prr	D,S	B	2M	B,Sc	Sg,Z	....	....	....	70
Aviation Mfg. Corp. (Lycoming)	R-680-B2	A	9	Rad	D	240	2000	S.L.	80	473	1.9	4⅝x4½	680.4	6.5	139.0	1.0	19¼	43¼	37 15/32	.50	.025	prr	.....	BG	M	Sc	Sg	Ec	No	1000	81
Aviation Mfg. Corp. (Lycoming)	R-680-B4	A	9	Rad	D	225	2100	S.L.	65	471	2.09	4⅝x4½	680.4	5.5	125.0	1.0	19¼	43¼	37 15/32	.50	.025	prr	.....	BG	M	Sc	Sg	Ec	No	1000	108
Aviation Mfg. Corp. (Lycoming)	R-680-B5	A	9	Rad	D	260	2300	S.L.	80	473	1.80	4⅝x4½	680.4	6.5	131.0	1.0	19¼	43¼	37 15/32	.50	.025	prr	.....	BG	M	Sc	Sg	Ec	No	1000	110
Aviation Mfg. Corp. (Lycoming)	R-680-B6	A	9	Rad	D	245	2300	S.L.	65	471	1.9	4⅝x4½	680.4	5.5	124.0	1.0	19¼	43¼	37 15/32	.50	.025	prr	.....	BG	M	Sc	Sg	Ec	No	1000	111
Burnelli Aircraft, Ltd.	AR-3	A	3	Rad	D	50	2125	.....	73	150	3.0	4½x4	160	5.0	120.0	....	12½	34¼	23 15/16	.55	.009	prr	Al,S	BG	M	B	Sg	.....	No	340	74
Burnelli Aircraft, Ltd.	AR-3-40	A	3	Rad	D	40	2050	.....	73	150	3.0	4½x4	160	5.0	115.0	....	12½	34¼	23 15/16	.55	.010	prr	Al,S	ES	M	B	Sg	.....	No	340	119
Continental Motors Corp.	A40-3	A	4	HOpp	D	37	2550	S.L.	72	144	3.9	3⅛x3¾	115	5.2	100.0	....	.....[1]	21 5/16	24	.70	.025	Lh	C	Op	M	B,Sc	Sg	.....	No	255	72
Continental Motors Corp.	R670[2]	A	7	Rad	D	210	2000	S.L.	72	425	2.0	5⅛x4⅝	668	5.4	125.0	....	20	42½	29⅛	.54	.025	prr	S	Op	M	Sc	Sg	Op	Yes	750	80[4]
Jacobs Aircraft Engine Co.	L-4	A	7	Rad	D	225	2000	S.L.	73	435	1.93	5¼x5	757	5.375	118.0	....	16½	43½	36 21/32	.50	.018	prr	S	BG	Bat	B	Sg	Ec	No	760	121
Jacobs Aircraft Engine Co.	L-4M	A	7	Rad	D	225	2000	S.L.	77	440	1.98	5¼x5	757	5.375	118.0	....	16½	43½	35⅛	.50	.018	prr	S	BG	M	Sc	Sg	Ec	No	780	121
Jacobs Aircraft Engine Co.	L-5	A	7	Rad	D	285	2000	S.L.	73	460	1.61	5½x5	831	6.0	136.0	....	16½	43½	36 21/32	.53	.018	prr	S	BG	Bat	B,Sc	Sg	Ec	No	870	156
Jacobs Aircraft Engine Co.	L-5M	A	7	Rad	D	285	2000	S.L.	73	475	1.68	5½x5	831	6.0	136.0	....	16½	43½	35⅛	.53	.018	prr	S	BG	M	Sc	Sg	Ec	No	970	156
Kinner Airplane & Motor Corp.	SC-7	A	7	Rad	D	370	1900	5,000	73	650	1.7	5⅝x6	1044	5.5	145.0	9.5	20	47¾	45 13/32	.55	.025	prr	S	BG	2M	Sc	Sg	Op	Op	1000	Pdg
Kinner Airplane & Motor Corp.	B-5	A	5	Rad	D	125	1925	S.L.	73	295	2.3	4⅝x5¼	441	5.25	116.0	....	14	45⅜	32 5/16	.55	.025	prr	S	BG	M	Sc	Sg,Hy	Op	Op	740	51
Kinner Airplane & Motor Corp.	C-5	A	5	Rad	D	210	1900	S.L.	33	420	2.0	5⅝x5¾	715	5.25	122.0	....	19¼	50	36¼	.55	.025	prr	S	BG	2M	Sc	Sg	Op	Op	800	62
Kinner Airplane & Motor Corp.	C-7	A	7	Rad	D	300	1800	S.L.	73	630	2.1	5⅝x6	1044	5.25	126.0	1.0	20	51 5/16	45 13/16	.55	.025	prr	S	BG	2M	Sc	Sg	Op	Op	1000	122
Kinner Airplane & Motor Corp.	K-5	A	5	Rad	D	100	1810	S.L.	73	275	2.75	4¼x5¼	372	5.0	117.0	....	14	45¾	32 5/16	.55	.025	prr	S	BG	M	Sc,B	Sg,Hy	Op	Op	740	3
Kinner Airplane & Motor Corp.	R-5	A	5	Rad	D	160	1975	S.L.	73	305	1.9	4⅞x5¼	490	5.0	130.0	....	14	45⅜	32 5/16	.55	.025	prr	S	BG	2M	Sc	Sg	Op	Op	740	77
Kinner Airplane & Motor Corp.	R-5 Series 2	A	5	Rad	D	160	1850	S.L.	73	325	2.0	5x5½	540	5.5	127.0	....	14	45 13/16	32 5/16	.55	.025	prr	S	BG	2M	Sc	Sg	Op	Op	740	....
Lambert Aircraft Corp.	R-266	A	5	Rad	D	90	2375	S.L.	73	221	2.45	4¼x3¾	266	5.55	113.0	....	13¾	35⅛	30⅜	.58	.0145	prr	NI	Ch	2M	Sc	Sg	Ec	No	....	38
LeBlond Aircraft Engine Corp.	5-DE70	A	5	Rad	D	70	1950	S.L.	80	245	3.5	4⅛x3¾	250.5	5.42	113.0	....	13⅜	33¼	22¼	.60	.015	prr	C	Ch	2M	B	Sg	Ec	No	430	48
LeBlond Aircraft Engine Corp.	5-DF-85	A	5	Rad	D	85	2125	S.L.	80	219	2.576	4¼x3¾	266.0	5.42	119.0	....	13⅜	33¼	22¼	.56	.015	prr	Al,S	Ch	2M	B	Hy	Ec	No	410	46
LeBlond Aircraft Engine Corp.	7-DF-110	A	7	Rad	D	110	2150	S.L.	80	275	2.50	4¼x3¾	372.0	5.4	112.0	....	13⅜	33¼	23 1/16	.56	.015	prr	Al,S	Ch	2M	Sc	Sg	Ec	No	475	52
Menasco Mfg. Co.	B-4	A	4	IdL	D	95	2000	.....	72	285	3.00	4½x5⅛	326	5.50	115.0	....	11⅜	28	47¾	.54	.006	prr	Al,NI	BG	2M[5]	Sc,B	Sg	Ec,B	No	440	65
Menasco Mfg. Co.	C-4	A	4	IdL	D	125	2175	.....	72	290	2.32	4¾x5⅛	363	5.50	125.0	....	11⅜	28	47¾	.50	.010	prr	Al,NI	BG	2M[5]	Sc,B	Sg	Ec,B	No	450	67
Menasco Mfg. Co.	C-4S	A	4	IdL	D	150	2260	3,000	72	305	2.03	4¾x5⅛	363	5.50	152.0	9.6	11⅜	28 9/16	47 17/32	.56	.010	prr	Al,NI[6]	BG	2M[5]	Sc,B	Sg	Ec	No	460	134
Menasco Mfg. Co.	B-6	A	6	IdL	D	160	1975	.....	72	385	2.40	4½x5⅛	489	5.50	130.0	....	11⅞	28 5/16	59 7/16	.54	.006	prr	Al,NI	BG	2M	B	Sg	Ec	No	630	68
Menasco Mfg. Co.	B-6S	A	6	IdL	D	200	2250	4,500	72	415	2.07	4½x5⅛	489	5.50	157.0	8.75	11⅞	28 5/16	59 7/16	.56	.018	prr	Al,NI[6]	BG	2M	B	Sg	Ec	No	683	139
Menasco Mfg. Co.	C-6S-4	A	6	IdL	D	250	2350	5,000	73	490	1.96	4¾x5⅛	544	5.50	155.0	8.76	12⅞	30 19/32	69 13/16	.56	.018	prr	Al,S	BG	Bat	Sc	Sg	Op	No	725	....
National Airplane & Motor Co.	35	A	2	Opp	D	35	2500	4,000	82	97	2.77	3⅞x4	108	6.0	35.0	....	10⅝	31	21⅝	.....	.025	ohc	N	AC	M	Sc	Sg	None	Yes	175	Pdg
Wiley Post Aircraft Co.	AL-1000	W	4	L	D	40	1900	.....	....	219[15]	....	3⅞x4¼	200.5	5.5	.....	....	.....	22½	39¼	.....	.....	.....	S	Ch	M	B	Ford	.....	.....	.....	....
Pratt & Whitney Aircraft	Wasp, Jr. SB	A	9	Rad	D	300[8]	2000	9,600	87	596	1.32	5⅛16x5⅜16	985	6.0	146.0	10.0	23⅜	45¾	42⅛	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	123
Pratt & Whitney Aircraft	Wasp S1D1	A	9	Rad	D	550	2200	5,000	80	736	1.34	5¾x5¾	1344	6.0	147.5	10.0	23⅜	51 7/16	42⅝	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	90
Pratt & Whitney Aircraft	Wasp S1H1-G	A	9	Rad	G[1]	400[10]	2000	11,800	87	883	1.47	5¾x5¾	1344	6.0	147.5	12.0	23⅜	51 7/16	48¼	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	129
Pratt & Whitney Aircraft	Wasp S2H1-G	A	9	Rad	G[1]	500	2200	10,500	80	883	1.76	5¾x5¾	1344	6.0	134.0	12.0	23⅜	51 7/16	48¼	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	141
Pratt & Whitney Aircraft	Wasp S3-D1	A	9	Rad	D	450	2100	6,000	73	736	1.63	5¾x5¾	1344	6.0	126.0	10.0	23⅜	51 7/16	42⅝	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	90
Pratt & Whitney Aircraft	Wasp S3-H1	A	9	Rad	D	550	2200	5,000	80	798	1.45	5¾x5¾	1344	6.0	147.5	10.0	23⅜	51 7/16	43⅜	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	143
Pratt & Whitney Aircraft	Wasp TD1	A	9	Rad	D	420	2000	S.L.	73	736	1.75	5¾x5¾	1344	6.0	123.5	10.0	23⅜	42⅝	51 7/16	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	90
Pratt & Whitney Aircraft	Twin Wasp, Jr. SA1 G	A	14	Rad S	G[1]	700	2500	8,500	87	990	1.41	5⅜16x5⅜16	1535	6.5	145.0	10.0	23⅜	43⅞	54½	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	95
Pratt & Whitney Aircraft	Twin Wasp S1-A4-G	A	14	Rad S	G[1]	830[11]	2400	6,000	87	1223	1.36	5½x5½	1830	6.5	149.0	11.0	23⅜	48	56¼	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	137
Pratt & Whitney Aircraft	Hornet S1E-G	A	9	Rad	G[1]	525[12]	2000	12,800	87	1015	1.26	6⅛x6⅜	1690	6.5	156.0	12.0	23⅜	54 7/16	51	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	136
Pratt & Whitney Aircraft	Hornet S2E-G	A	9	Rad	G[1]	525[12]	2000	9,500	87	1015	1.26	6⅛x6⅜	1690	6.0	156.0	10.0	23⅜	54 7/16	51	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	144
Pratt & Whitney Aircraft	Hornet S3E-G	A	9	Rad	G[1]	675	2250	6,000	80	1015	1.50	6⅛x6⅜	1690	6.0	140.5	11.0	23⅜	54 7/16	51	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	Pdg
Pratt & Whitney Aircraft	Hornet S5E	A	9	Rad	D	700	2050	6,000	87	920	1.31	6⅛x6⅜	1690	6.5	160.0	13.0	23⅜	54 7/16	45⅜	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	Pdg
Pratt & Whitney Aircraft	Hornet S9E	A	9	Rad	D	650	2050	3,000	80	920	1.41	6⅛x6⅜	1690	6.0	148.5	10.0	23⅜	54 7/16	45⅜	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	152
Pratt & Whitney Aircraft	Hornet S10E	A	9	Rad	D	575	2000	2,000	80	920	1.59	6⅛x6⅜	1690	6.0	134.5	10.0	23⅜	54 7/16	45⅜	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	Pdg
Pratt & Whitney Aircraft	Hornet S11E	A	9	Rad	D	525	2000	4,000	73	920	1.77	6⅛x6⅜	1690	6.0	123.0	10.0	23⅜	54 7/16	45⅜	.48[9]	.035	prr	Al,S	BG	2M	Sc	Sg	Ec	No	....	Pdg
Ranger Engineering Corp.	6-390-B	A	6	IdL	D	145	2250	S.L.	73	350	2.41	4x5⅛	386.4	6.0	132.0	....	.....	31 25/32	50 27/32	.55	.025	ohc	Al,S	BG	2M	Sc	Sg	Op	Op	730	146
Ranger Engineering Corp.	V-770-B	A	12	IdV	D	300	2250	S.L.	80	545	1.88	4x5⅛	772.8	6.0	145.0	....	15½	27 3/16	59 27/32	.55	.025	ohc	S	BG	2M	Sc	2-Sg	Op	Op	1100	Pdg
Ranger Engineering Corp.	SGV-770-A	A	12	IdV	D[1]	420	2800	S.L.	80	600	1.43	4x5⅛	772.8	6.0	154.0	7.71	15½	31 13/16	59 27/32	.55	.025	ohc	Al,S	BG	2M	Sc	Sg	Op	Op	1150	84
Rover Aircraft Motors	L-267	A	4	IdL	D	75	1975	.....	....	240[15]	3.20	4½x5	267.28	5.1	.....	....	16⅝	29⅛	37 9/16	.58	.015	prr	Al,NI	.....	2M	Sg	Sg	Op	Yes	383	37
Security National Aircraft Corp.	5S	A	5	Rad	D	120	1800	.....	....	278	....	4¾x5	442	5.0	.....	....	.....	40	24	.50	....	....	Al,NI	BG	M	Sg	Hy	Sc	....	....	....	Pdg
Warner Aircraft Corp.	Super Scarab	A	7	Rad	D	145	2050	.....	72	300	2.05	4¾x4¼	499	5.3	114.0	....	17	36 9/16	28⅞	.53	.025	prr	Al,S	BG	2M	Sg	Sg	Op	No	520	104
Warner Aircraft Corp.	Scarab Junior	A	5	Rad	D	90	2025	.....	72	235	2.5	4¼x4¼	301	5.2	115.0	....	15	28 5/16	28 1/16	.53	.030	prr	Al,S	AC	2M	80	Hy	Op	No	505	a 54
Reliance[12]	Reliance[12]	A	7	Opp	D	45	2500	S.L.	72	115	2.4	4½x4½	135	5.2	.....	....	6¾	25½	24½	.62	.02	ohc	Al,S	BG	M	Wico	Wico	Welch	Yes	200	....
Welch Aircraft Motors	C-2	A	7	Opp	D	45	2500	S.L.	72	115	2.4	4½x4½	135	5.2	.....	....	6¾	25½	24½	.64	.02	ohc	Al,S	BG	M	Wico	Sg	Welch	Yes	300	....
Wright Aeronautical Corp.	Whirlwind R760-ET	A	7	Rad	D	235	2000	S.L.	73	500	2.13	5x5½	756	6.0	123.0	....	19¼	45	42 23/32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1015	126

Ranger Engineering Corp.	V-770-B	A	12	IdV	D	300	2250	S.L.	80	545	1.88	4x5⅛	772.8	6.0	145.0	.....	15½	27⅜₁₆	59²⁷⁄₃₂	.55	.025	ohc	S	BG	2M	Sc	2-Sg	Op	Op	1100	Pdg
Ranger Engineering Corp.	SGV-770-A	A	12	IdV	G¹	420	2800	S.L.	80	600	1.43	4x5⅛	772.8	6.0	154.0	7.71	15½	31 13⁄16	59²⁷⁄₃₂	.55	.025	ohc	Al,S	BG	2M	Sc	Sg	Op	Op	1150	84
Rover Aircraft Motors	L-267	A	4	IdL	D	75	1975	.....	.....	240[15]	3.20	4½x5	267.28	5.1	.....	.....	16⅞	29⅛	37⅜₁₆	.58	.015	prr	Al,NI	.....	2M	Sc	Sg	Op	Yes	383	37
Security National Aircraft Corp.	5S	A	5	Rad	D	120	1800	.....	.....	278	.....	4¾x5	442	5.0	.....	.....	17	40	24	.50	.....	.....	Al,NI	BG	M	Sc	Hy	Se	.....	.....	.....	Pdg
Warner Aircraft Corp.	Scarab	A	7	Rad	D	145	2050	.....	72	300	2.05	4¾x4¼	499	5.3	114.0	.....	17	36 9⁄16	28⅛	.53	.025	prr	Al,S	BG	2M	Sc	Sg	Op	No	430	104
Warner Aircraft Corp.	Scarab Junior	A	3	Rad	D	90	2025	.....	72	250	2.25	4¼x4¼	301	5.2	113.0	.....	17	36 9⁄16	28⅛	.55	.020	prr	Al,S	AC	2M	Sc	Sg	Op	No	465	54
Warner Aircraft Corp.	Reliance[12]	A	2	Opp	D	45	2500	S.L.	72	115	2.4	4½x4¼	135	5.2	.....	.....	6¾	25½	24½	.62	.02	ohc	Al,S	BG	M	Wico	Z	Welch	Yes	200	.....
Welch Aircraft Motors	O-2	A	2	Opp	D	45	2500	S.L.	72	115	2.4	4½x4¼	135	5.2	.....	.....	6¾	25½	24½	.64	.02	ohc	Al,S	BG	M	Wico	Z	Welch	Yes	300	.....
Wright Aeronautical Corp.	Whirlwind R760-ET	A	7	Rad	D	235	2000	S.L.	73	500	2.13	5x5½	756	6.0	123.0	.....	19¼	45	42 23⁄32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1015	126
Wright Aeronautical Corp.	Whirlwind R760-E	A	7	Rad	D	250	2000	S.L.	73	495	1.98	5x5½	756	5.1	130.5	7.05	19¼	45	42 23⁄32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1010	26
Wright Aeronautical Corp.	Whirlwind R760-E1	A	7	Rad	D	285	2100	S.L.	73	515	1.81	5x5½	756	6.0	42.0	7.05	19¼	45	42 23⁄32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1030	94
Wright Aeronautical Corp.	Whirlwind R760-E2	A	7	Rad	D	320	2200	S.L.	80	515	1.61	5x5½	756	6.3	152.0	9.17	19¼	45	42 23⁄32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1030	155
Wright Aeronautical Corp.	Whirlwind R975-E	A	9	Rad	D	330	2000	S.L.	73	580	1.76	5x5½	973	5.1	134.0	7.8	19¼	45	43 15⁄32	.55	.025	prr	Al,S	RG	2M	Sc	Sg	Ec	Yes	1110	21
Wright Aeronautical Corp.	Whirlwind R975-E1	A	9	Rad	D	365	2100	S.L.	73	615	1.69	5x5½	973	6.0	141.5	7.8	19¼	45	43 15⁄32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1140	87
Wright Aeronautical Corp.	Whirlwind R975-E3	A	9	Rad	D	420	2200	1,400	80	685	1.63	5x5½	973	6.3	155.5	10.15	19¾[14]	45	43 15⁄32	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	Yes	1210	125
Wright Aeronautical Corp.	Whirlwind R1510-C	A	14	Rad S	D	670	2200	1,700	87	970	1.45	5x5½	1512	7.0	159.5	5.95	22 5⁄16	45	50¾	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1750	Pdg
Wright Aeronautical Corp.	RWhirlwind G1510-C	A	14	Rad S	G²	715	2400	1,900	87	1025	1.44	5x5½	1512	7.0	156.0	5.95	22 5⁄16	45	52⅜	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	Pdg
Wright Aeronautical Corp.	Whirlwind R1510-C1	A	14	Rad S	D	650	2200	6,300	87	970	1.49	5x5½	1512	7.0	155.0	6.3	22 5⁄16	45	50¾	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1750	Pdg
Wright Aeronautical Corp.	Whirlwind GR1510-C1	A	14	Rad S	G²	700	2400	7,000	87	1025	1.47	5x5½	1512	7.0	153.0	6.3	22 5⁄16	45	52⅜	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	Pdg
Wright Aeronautical Corp.	Whirlwind R1510-C2	A	14	Rad S	D	635	2200	8,700	87	970	1.53	5x5½	1511	7.0	151.0	7.0	22 5⁄16	45	50¾	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1750	Pdg
Wright Aeronautical Corp.	Whirlwind GR1510-C2	A	14	Rad S	G²	670	2400	10,000	87	1025	1.53	5x5½	1512	7.0	146.0	7.0	22 5⁄16	45	52⅜	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	Pdg
Wright Aeronautical Corp.	Whirlwind R1510-C3	A	14	Rad S	D	575	2200	13,700	87	970	1.69	5x5½	1512	7.0	137.0	8.31	22 5⁄16	45	50¾	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1750	Pdg
Wright Aeronautical Corp.	Whirlwind GR1510-C3	A	14	Rad S	G²	600	2400	15,400	87	1025	1.71	5x5½	1512	7.0	131.0	8.31	22 5⁄16	45	52⅜	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	Pdg
Wright Aeronautical Corp.	Cyclone R1820-F21	A	9	Rad	D	660	1950	S.L.	73	947	1.44	6⅛x6⅞	1822	5.3	147.0	5.95	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	93
Wright Aeronautical Corp.	Cyclone GR1820-F21	A	9	Rad	G³	644	1950	S.L.	73	1042	1.62	6⅛x6⅞	1823	5.3	143.0	5.95	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	93
Wright Aeronautical Corp.	Cyclone R1820-F11	A	9	Rad	D	690	1950	S.L.	80	947	1.37	6⅛x6⅞	1823	5.75	153.5	5.95	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	97
Wright Aeronautical Corp.	Cyclone GR1820-F11	A	9	Rad	G³	673	1950	S.L.	80	1042	1.55	6⅛x6⅞	1823	5.75	150.0	5.95	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	97
Wright Aeronautical Corp.	Cyclone R1820-F31	A	9	Rad	D	680	1950	1,800	80	947	1.39	6⅛x6⅞	1823	6.4	151.5	5.95	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	101
Wright Aeronautical Corp.	Cyclone GR1820-F31	A	9	Rad	G³	663	1950	1,800	80	1042	1.57	6⅛x6⅞	1823	6.4	147.5	5.95	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	101
Wright Aeronautical Corp.	Cyclone R1820-F32	A	9	Rad	D	675	1950	6,300	80	955	1.42	6⅛x6⅞	1823	6.4	150.0	7.0	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	135
Wright Aeronautical Corp.	Cyclone GR1820-F32	A	9	Rad	G³	658	1950	6,300	80	1050	1.6	6⅛x6⅞	1823	6.4	146.5	7.0	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	135
Wright Aeronautical Corp.	Cyclone R1820-F33	A	9	Rad	D	655	1950	9,800	80	955	1.44	6⅛x6⅞	1823	6.4	146.0	8.31	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	118
Wright Aeronautical Corp.	Cyclone GR1820-F33	A	9	Rad	G³	639	1950	9,800	80	1050	1.65	6⅛x6⅞	1823	6.4	142.0	8.31	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	118
Wright Aeronautical Corp.	Cyclone R1820-F1	A	9	Rad	D	715	1950	S.L.	87	947	1.32	6⅛x6⅞	1823	6.4	159.0	5.95	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	89
Wright Aeronautical Corp.	Cyclone GR1820-F1	A	9	Rad	G³	700	1950	S.L.	87	1042	1.49	6⅛x6⅞	1823	6.4	156.0	5.95	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	89
Wright Aeronautical Corp.	Cyclone R1820-F2	A	9	Rad	D	768	1950	2,600	87	955	1.24	6⅛x6⅞	1823	6.4	171.0	7.0	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	98
Wright Aeronautical Corp.	Cyclone GR1820-F2	A	9	Rad	G³	750	1950	2,600	87	1050	1.40	6⅛x6⅞	1823	6.4	167.0	7.0	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	98
Wright Aeronautical Corp.	Cyclone R1820-F3	A	9	Rad	D	715	1950	7,400	87	955	1.34	6⅛x6⅞	1823	6.4	159.0	8.31	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	103
Wright Aeronautical Corp.	Cyclone GR1820-F3	A	9	Rad	G³	697	1950	7,400	87	1050	1.51	6⅛x6⅞	1823	6.4	155.0	8.31	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	103
Wright Aeronautical Corp.	Cyclone R1820-F52	A	9	Rad	D	765	2100	5,600	87	965	1.26	6⅛x6⅞	1823	6.4	158.0	7.0	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	Pdg
Wright Aeronautical Corp.	Cyclone GR1820-F52	A	9	Rad	G³	750	2100	5,600	87	1060	1.42	6⅛x6⅞	1823	6.4	155.0	7.0	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	Pdg
Wright Aeronautical Corp.	Cyclone R1820-F53	A	9	Rad	D	745	2100	9,600	87	965	1.30	6⅛x6⅞	1823	6.4	154.0	8.31	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	Pdg
Wright Aeronautical Corp.	Cyclone GR1820-F53	A	9	Rad	G³	730	2100	9,600	87	1060	1.45	6⅛x6⅞	1823	6.4	151.0	8.31	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1800	Pdg
Wright Aeronautical Corp.	Cyclone R1820-F54	A	9	Rad	D	690	2100	15,300	87	965	1.40	6⅛x6⅞	1823	6.4	143.0	10.0	23⅜	53¾	43⅜	.60	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1700	Pdg
Wright Aeronautical Corp.	Cyclone GR1820-F54	A	9	Rad	G³	675	2100	15,300	87	1060	1.57	6⅛x6⅞	1823	6.4	139.5	10.0	23⅜	53¾	47 13⁄16	.61	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	1500	Pdg
Wright Aeronautical Corp.	Conqueror GV1570-F1	W	12	V	G⁴·⁵	655	2450	S.L.	80	995	1.52	5⅛x6¼	1587	6.5	134.0	.....	15¾	39¼	68 27⁄32	.55	.025	ohc[16]	Al,S	BG	DM	Sc	2-Sg	Ec	No	1100	7
Wright Aeronautical Corp.	Conqueror GV1570-F2	W	12	V	G⁴	675	2450	S.L.	87	1000	1.48	5⅛x6¼	1587	7.25	137.5	.....	15¾	39¼	68 27⁄32	.52	.025	ohc[16]	Al,S	BG	DM	Sc	2-Sg	Ec	No	8500	131

Footnotes

A —Air cooled
Al —Aluminum
Apl —Applied for
B —Bosch
Bat —Battery ignition
C —Cast Iron
Ch —Champion
D —Direct
DM —Dual magneto
Ec —Eclipse
ES —Edison Splitdorf
G —Geared
G¹ —3:2 reduction gear
G² —4:3 reduction gear
G³ —16:11 reduction gear
G⁴ —7:5 reduction gear
G⁵ —2:1 reduction gear
H —Horizontal
Hy —Holley
Id —Inverted
L —Cylinders in line
Lh —"L" head
M —Magneto
NI —Nickel iron
Op —Optional
Opp —Opposed
ohc —Overhead cam
Pdg —Pending
prr —Push rods and rocker arms
Rad —Radial
Rad S —Staggered radial
S.L. —Sea Level
Sc —Scintilla
Sg —Stromberg
S —Steel
V —Vee
W —Liquid cooled
Z —Zenith

*All engines, unless otherwise noted, equipped with single intake valve. [1]8½" horizontal; 10⅝" vertical. Four bolts in rear of crankcase. [2]Available with front or rear exhaust. [3]On front exhaust only. [4]ATC 120 with 6.1 compression ratio. [5]Battery ignition optional. [6]Steel barrels optional. [7]15" front; 17" rear. [8]At cruising speed. 450 hp. available for take-off at 2,300 rpm. [9]At cruising hp. [10]At cruising speed. 600 hp. available for take-off at 2,250 rpm. [11]At cruising speed. 900 hp. available for take-off at 2,465 rpm. [12]At cruising speed. 800 hp. available for take-off at 2,300 rpm. [13]Dissembled. [14]Can be 23 3⁄8". [15]With hub. [16]Two intake valves per cylinder.

Editorials

AVIATION

$500 Fine

TUCKED away in the regulations now in force governing international traffic in arms, munitions and implements of war, is one of those nasty little stingers that have appeared as byproducts of many pieces of New Deal legislation. As usual, it is difficult to discover whether this one was slipped in with malice aforethought or just happened. Whatever the reason, manufacturers of aircraft, engines, and certain parts have lately awakened to the fact that Uncle Sam has served notice on them that it will cost them just $500 for the privilege of staying in business.

The obvious intent of the regulations governing the international traffic in arms was to give the government some degree of control over munitions of war exported to other countries. Section 2 of the Joint Resolution covering the case (Dept. of State Publication No. 794) says in part, "within ninety days after the effective date of this Act . . . every person who engages in the business of manufacturing, exporting, or importing any of the arms, munitions, or implements of war referred to in this Act, whether as an exporter, importer, manufacturer, or dealer, shall register with the Secretary of State . . . and . . . every person required to register . . . shall pay a registration fee of $500. . . ."

▶ With that we have no quarrel. With international relations as delicately balanced as they are today it seems only a measure of good sense to keep a restraining hand on all possible upsetting elements. And certainly (and without any intent to make a bad pun) the munitions business contains plenty of dynamite.

The joker appeared when, acting under the authority of the bill, a proclamation was issued from the White House defining the terms "arms, munitions, and implements of war."

First direct reference to aircraft comes in Category III which classes as munitions "(1) Aircraft, assembled or dismantled, both heavier and lighter than air, which are designed, adapted, and intended for aerial combat by the use of machine guns or of artillery or for the carrying and dropping of bombs, or which are equipped with, or which by reason of design or construction are prepared for, any of the appliances referred to in paragraph (2) below. (2) Aerial gun mounts and frames, bomb racks, torpedo carriers, and bomb or torpedo release mechanisms."

So far so good. Beyond all doubt here is a clear and comprehensive definition of what constitutes aerial armament and as such has proper place in a munitions control act.

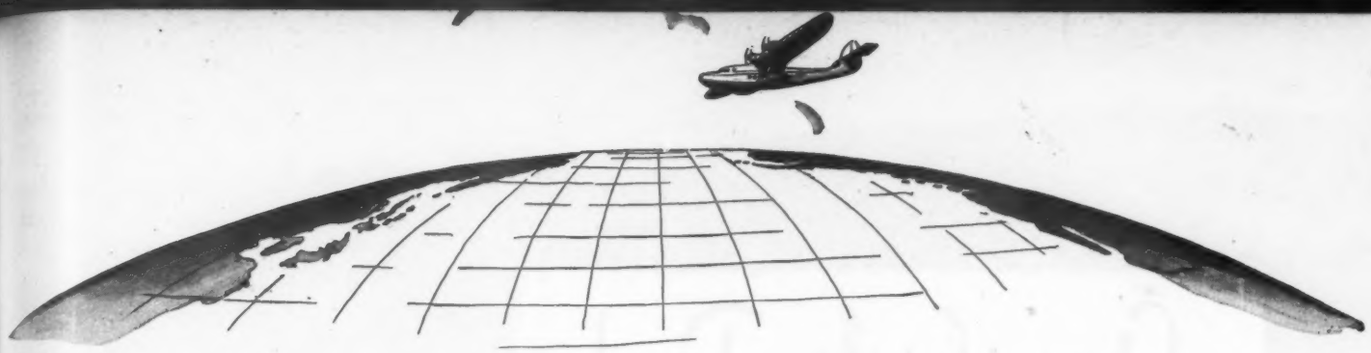
▶ BUT—Category V further defines as munitions of war "(1) Aircraft assembled or dismantled, both heavier and lighter than air, *other than those included in Category III;* (2) Propellers or air screws, fuselages, hulls, tail units, and undercarriage units; (3) Aircraft engines."

Believe it or not, by Presidential definition every single aircraft, from glider, sailplane, power glider, light plane, sportster and up is a military plane. A Flying Flea built in a cellar or garage is an implement of war. Every 2, 3, or 4-cylinder engine, grinding out its 40 or 50 hp. is in the same class as a machine gun or a tank of mustard gas. Every matchstick propeller, every set of seaplane floats, every shock absorber unit, every landing wheel, and even every set of tires is a lethal weapon. And everyone who sets himself up to make or sell or deal in any such article makes himself immediately liable to a $500 assessment.

Nor is it necessary to have any intention to ship any of those products outside of the country. The only qualifications for assessment under this Act is engaging in the business—"whether as an exporter, importer, manufacturer, or dealer."

To the big manufacturers who are actually interested in the export market and to certain New Dealers, $500 may seem scarcely worth mentioning. But to a lot of people it is still a lot of money. To many a small manufacturer (most of whom never considered themselves as military manufacturers or as exporters) it may amount to confiscation of a considerable percentage of the year's profits. It is difficult to understand why, if a licensing arrangement seems to be the answer, the assessment needed to be so high. Simply as a registration fee, $5 should be ample.

▶ We are willing to take a charitable view of the situation and concede that the interpretation of the Act is far beyond the original intent. The joker probably slipped into the deck by mistake. The solution lies in the complete elimination, or at least some drastic modification of Category V to exempt all aircraft that are patently of no serious military significance, as was done for small arms in Category I. It could be done simply by a new proclamation from the White House. Here is a chance for the President to correct an obvious injustice, and to prove to a somewhat skeptical industry that his administration is willing once in a while to pass up an opportunity to crack down on aviation.

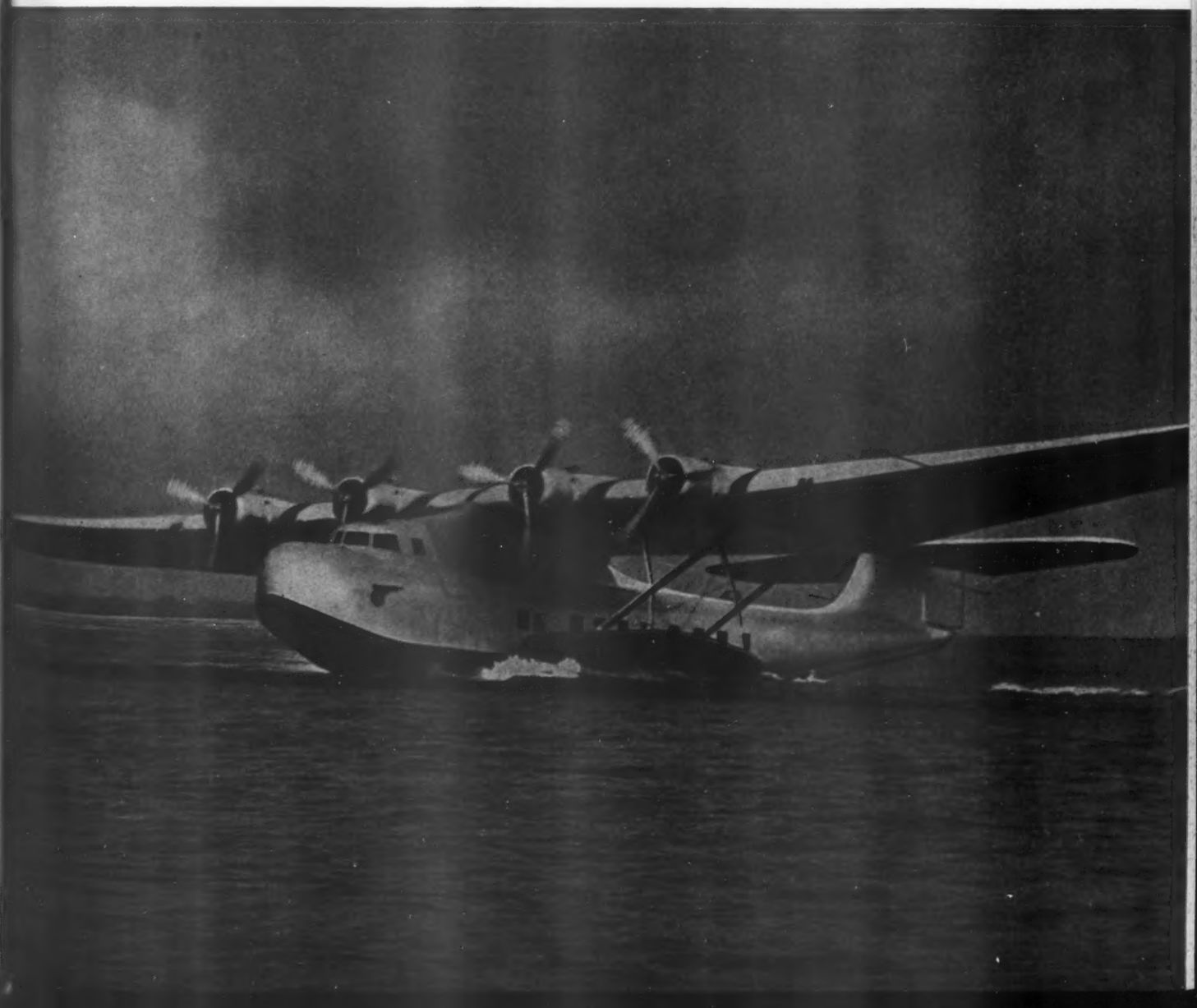


Air Service to Europe... MARTIN IS READY

Martin-built ships of the China Clipper type already have proved their capacity for trans-Atlantic service. Carrying bundles to China for Pan-American Airways, they span far greater distances, and make far longer non-stop flights, than are involved in any of the proposed U.S. to Europe routes.

THE GLENN L. MARTIN COMPANY
BALTIMORE, MARYLAND

Builders of dependable *aircraft since 1909*



Greatest Striking Power!
In close cooperation with the U. S. Air Corps, the Martin Company is producing bombing planes which provide the greatest striking power for national defense ever developed in any country. Martin Bombers are not only the world's fastest now in service, but are highly maneuverable even when heavily loaded with bombs and fuel for long range use.
THE GLENN L. MARTIN COMPANY
BALTIMORE, MARYLAND
Builders of dependable aircraft since 1909

News of the Month

★ ***Transport*** **..... Witnesses at Senate safety hearings criticize administration and operation of ground navigation facilities . . . Post Office rules against Braniff on off-line competition with American and on wage scale charges . . . Central Airlines reports phenomenal 1935 increases . . . American orders ten more Douglases . . . I.C.C. boosts mail rate for National Airlines System . . . TWA experiments with facsimile radio . . . United Air Lines opens new equipment program with appropriation for ten 24-passenger Douglas transports.**

★ ***Army and Navy*** **. . . Air Corps completes New England test of winter technique in operations centered at Concord, N. H. . . . Marines exercise in Caribbean . . . Navy patrol boats off western coast of South America . . . Carrier forces with fleet in exercises out of San Diego . . . House of Representatives sends record Air Corps equipment appropriation to Senate.**

★ ***Foreign*** **. . . Interdepartmental committee negotiates trans-Atlantic agreement with German mission.**

★ ***Lighter than Air*** **. . . Durand Committee recommends resumption of Navy airship program.**

★ ***Industry*** **. . . Details released on new roadable autogiro . . . Menasco and Ryan report new levels of production . . . Consolidated sub-contracts work on patrol-boat wing panels to Bell Aircraft Corp. . . . Curtiss-Wright starts production on ten trainers in St. Louis plant . . . Cessna names London agent . . . Beechcraft delivered to French pilot.**

★ ***Financial*** **. . . Douglas, Northrop, Lockheed, North American, United Aircraft and Irving all show net profits in 1935 statements.**

Safety Measures

Senate's investigation of airline safety turns into critique of Air Commerce Bureau navigation aids.

"LET me say this, we are aware of the investigations which have been made in the past. We are familiar with the Prall investigation of 1925, and the Akron investigation of 1933, as well as the work of the Baker Board of 1934, and particularly the aviation investigation of 1935. . . .

"Now . . . let me ask this question: In your experience and observation, what specific details in the management, material and regulation of air traffic could be and should be recommended by the committee for the purpose of promoting safety for air traffic in any and all respects? That may be the text this morning for our discussion."

Thus Senator Royal S. Copeland ended his preamble Feb. 10 to the long-delayed hearings on air line safety by the Senate Committee appointed after the death of Senator Cutting.

Airline officials, leary of another unsympathetic Senatorial quizzing, heaved sighs of relief as the reasonable preamble was followed by proof after proof of the committee's constructive intentions.

As the week slipped by, witness after witness gave testimony. Fragments:

Leighton W. Rogers, president of the Aero Chamber of Commerce—"We find, and I believe the accident statistics . . . bears out, that comparatively a small percentage of the accidents are due to structural failures. . . . The one point I can make is, I believe, more coordination in the governmental agencies having to do with progress and development in the manufacture of aircraft."

C. R. Smith, president of American Airlines—"We have a good many routes in the United States, including some we operate, that have no (ground) aids at all. . . . When we started in the aviation business . . . most . . . lines had one schedule a day and a certain weather reporting system was adequate. . . . Some have ten or fifteen schedules a day now . . . and weather facilities adequate several years ago are not at all adequate today."

D. W. Tomlinson of TWA—"Near the major terminals we need very exact control of traffic . . . (for it) we need additional radio range stations in the approximate vicinity of these terminals. . . . We need much stronger beacon lamps on the fields. . . . We need more airplane observations for our present method of weather analysis."

Carl Dolan, senate investigator, formerly aviation expert for the Post Office, charged that in order to save about $2,000 the Air Commerce Bureau had replaced 1,000-watt airline beacon bulbs with 500 watt ones, that its field forces frequently ignored Bureau regulations, that the Bureau's accident reports had never blamed the Bureau itself or any of its services. Dolan also pointed out that in spite of poor navigation aids and consistent operating losses the airlines themselves had maintained high standards for equipment and maintenance, had in fact improved the airline safety record five-fold since 1927.

Harry F. Guggenheim—urged open crash inquiries and better airport facilities, gave point to the later criticism by reference to the inadequacy of Washington's own air terminal.

Jack Frye, TWA president—told of beacon and other changes carried out without notice to airlines.

E. S. Gorrell, president of the Air Transport Association—presented a map showing what additional and improved ground aids the airlines specifically wanted. Estimated cost $14,000,000.

Jay Albert Mount, in charge of airway coordination and maintenance of airways for the Bureau in 1934, topped all others in Bureau criticism—On an inspection trip "I found surplus (airway) equipment everywhere . . . in flying fields, in barns, in open fields, some of it rotting in the crates in which it was originally packed. Finally, he claimed he had been discharged from the Bureau for revealing his findings to the Senate Committee.

The latter statement was vigorously denied by Rex Martin. Other allegations of political interference with personnel led Eugene Vidal to state the Bureau had replaced only fourteen men in the last two years and a half. Beacons, radio and other facilities were not ade-

quate, he admitted, but he denied that inspectors were negligent.

Empowered only to make recommendations to the Senate the committee at the end of the week announced it would resume hearings "later."

Pact with Reich

Agreement permits German participation in Trans-Atlantic services.

TWO MONTHS after announcing the completion of negotiations with British authorities clearing the way toward a British-American service across the North Atlantic, R. Walton Moore, chairman of the interdepartmental committee on international civil aviation had another statement to issue.

Early in February a German mission, consisting of Willy Fisch, chief of the general air office of the Air Navigation Ministry; Maj. Martin Wronsky, managing director of the Luft Hansa and Heinrich Thomas of the Ministry of Posts, arrived in Washington to negotiate for German participation.

Feb. 14 Mr. Moore told the press: "Discussions with regard to the organization of air traffic across the North Atlantic which have taken place during the past week between the representatives of the United States and a German delegation were satisfactorily concluded today.

"The conversations, touching a large field of problems concerning trans-Atlantic air traffic, have been discussed in detail and the following understanding reached:

"The Department of Commerce is prepared to make the full facilities under the control of the United States Government available to any German company or companies for use in carrying out experimental flights during 1936, the German Air Mission having offered to reciprocate in that respect through the use of similar facilities under the control of the German Government.

"Based on the results of the experimental flights, both governments will consider possible methods of arranging for regular services.

"Members of the German mission stated that notwithstanding the experimental flights above mentioned, a certain number of demonstration trips across the North Atlantic with the new Zeppelin airship will be operated, as heretofore arranged."

Calendar

May 15, June 1—International Aero Exhibition, Stockholm, Sweden.
June 20-July 5—Seventh Annual National Soaring Contest, Elmira, N. Y.
Sept. 3-6—National Air Races, Cleveland, Ohio.
Oct. 25—Paris-Saigon Air Race.

The Transport Month

Braniff restrained from Tulsa service by P. O. Central reports big growth in traffic. American and United each order ten big Douglases.

IN THE absence of any such important interline developments as have been reported in the two previous issues of AVIATION, chief item of common interest in February airline developments was a Post Office decision handed down Feb. 15 in the Braniff case.

Some months ago American Airlines and the Airline Pilots' Association had both filed complaints with the Post Office. The former alleged that Braniff violated the present Air Mail law's offline provisions in operating a Dallas-Chicago service via Oklahoma City, Tulsa and Kansas City in competition with American's Dallas-Chicago service via Oklahoma City, Tulsa and St. Louis. The latter alleged that Braniff was violating the wage scale provisions of the same law especially in its rate of pay for co-pilots.

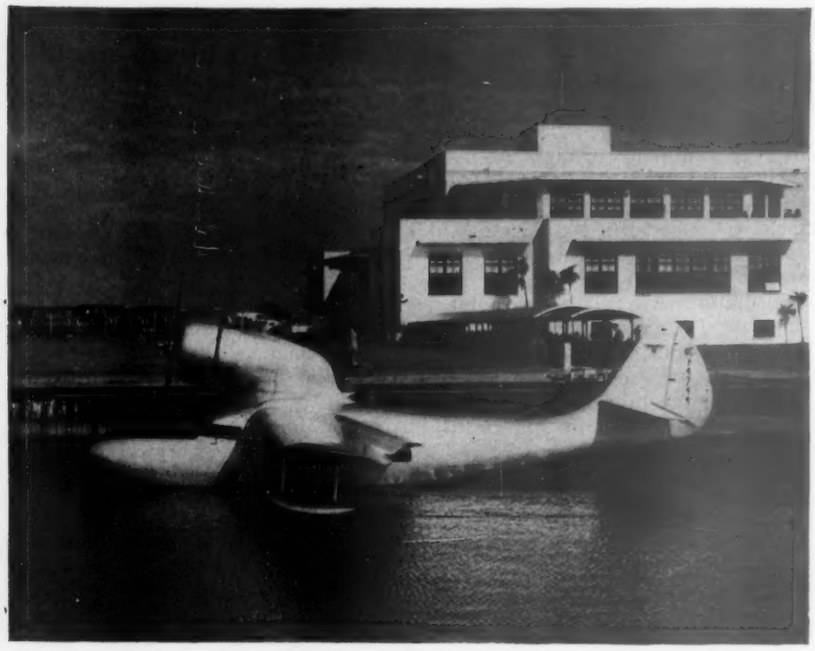
Finding the charges correct in both cases the Post Office ordered air mail compensation withheld from Braniff until it ceased such violations. Furthermore it set Feb. 25 as the deadline for a Braniff choice between compliance and cancellation of its air mail contract.

As a consequence, Braniff Feb. 20 announced the discontinuance of its trips number 3 and 9 southbound, and its number 12 northbound service.

Braniff had recently released traffic figures showing a phenomenal growth during the last half of 1935, passengers carried were 376 per cent over those carried during the last six months of 1934. Revenue was up 738 per cent. Furthermore December figures showed an increase over those of 1935 of 46.7 per cent in mail poundage, and 48 per cent in express.

Central Airlines also reported big increases in 1935 traffic over 1934 figures: Passengers carried 207 per cent; air mail poundage 95 per cent; express poundage 230 per cent.

Completing its 93,000,000th airplane-mile Feb. 1, United set an estimate on its 1936 traffic of 100,000,000 revenue passenger-miles. Its 1935 total had been 87,108,711 passenger-miles, 13,339,352 better than the corresponding 1934 figure. To provide for such an increase in traffic as well as to make possible nonstop services in either direction between

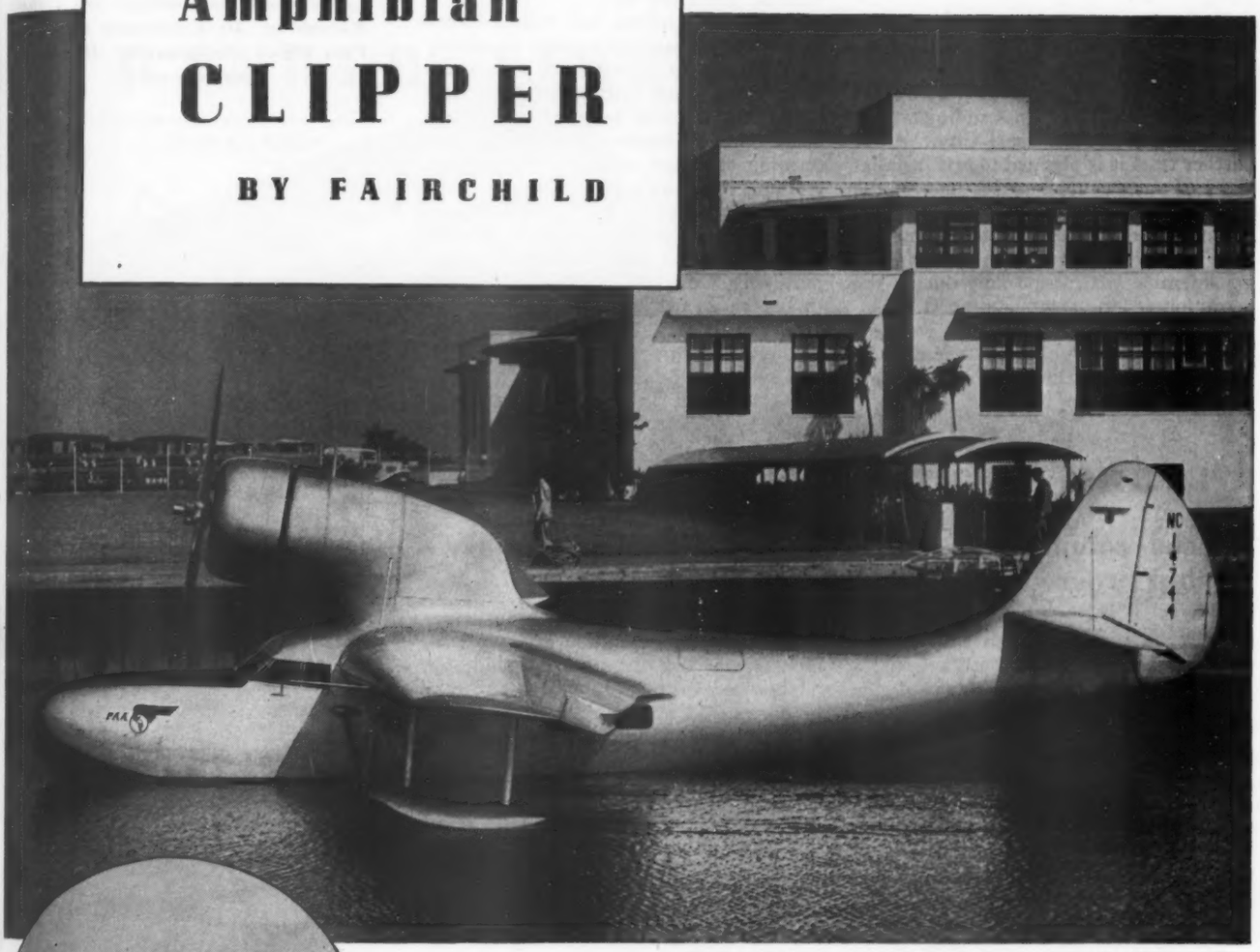


BABY CLIPPER

rests at Miami on way to service on the Pan American route from Para, Brazil, up the Amazon to Manaos. A sister ship to this Pratt and Whitney Hornetted Fairchild amphibian is to be delivered soon for service on another Pan American route along the Yangtze River in China.

Amphibian CLIPPER

BY FAIRCHILD



Fairchild 10-place Amphibian Clipper at Miami, en route to Brazil for service by Pan American Airways on the 933-mile "Jungle Run" from Para to Manaos.

PERFORMANCE—translated into high utility value—attains unusual levels in the Fairchild "91" Amphibian, for passenger and cargo transport, private ownership, coast patrol, military reconnaissance and transport of personnel. . . . Extreme aerodynamic and structural refinements result in a useful load capacity of 40% of the 10,500 lb. gross load! 8 to 11 passengers with 810 to 300 lbs. of luggage, 2 pilots and 200 lbs. of radio, are carried at 150 m.p.h. cruising (at 5200 ft.) for 630 miles. Top speed 173 m.p.h. As a cargo flying boat, the range is 2,000 miles with 2 pilots, radio and half a ton of cargo. . . . A hull corrosion-proofed by specially developed processes—complete equipment for day and night operation over land or water—numerous important refinements in design and construction resulting from the extensive operating experience of Pan American Airways, distinguish this newest of single-engine Amphibians. Available with 750 h.p. Wright or Pratt & Whitney engines. . . . Complete data and cost analysis for any specific service will be gladly furnished. FAIRCHILD AIRCRAFT CORP., Hagerstown, Maryland. *Division of Fairchild Aviation Corp.*

FAIRCHILD AIRPLANES · CAMERAS · INSTRUMENTS · AERIAL SURVEYS · RANGER ENGINES.

New York and Chicago, United announced last month it would order ten of the new Douglas 24-passenger transports.

TWA has released news that it has been cooperating with the Radio Corporation of America in experiments with the facsimile transmission of messages between the airlines radio stations in Chicago and Kansas City. After further tests it is planned to test installations of such equipment in some of the line's planes. Advantages: Typewritten or script messages would be automatically recorded, relieving the co-pilot of considerable labor, especially during the reception of long weather reports.

The I.C.C. last month upped payment over Air Mail Route No. 31 operated by the National Airlines System. New rates (up to 300 lb.): from St. Petersburg and Daytona Beach 30 cents per mile; from St. Petersburg to Jacksonville 27 cents per mile.

American Airlines last month issued a new set of passenger maps consisting of a large map showing the entire airline net work and thirteen separate strip maps for different sections of its own 6,845 miles of routes. It announced the opening of a new school in Chicago for training company personnel based on its experimental school for traffic salesmen recently conducted in New York. Finally it announced an additional order of ten more big Douglases, bringing its total to twelve 24-passenger day planes, and eight which will be convertible to sleepers. Its total investment in these ships will represent $2,500,000.

Durand Board Says, "Up Ship"

Special committee recommends resumption of Navy's airship program.

A FEW DAYS after the airship Macon met disaster off the California Coast a year ago February, Secretary of the Navy Swanson wrote to Dr. Karl T. Compton, president of the Massachusetts Institute of Technology and Chairman of the National Science Advisory Board asking the board to appoint a suitable committee "to review and analyze the past and present situation as to the design and construction of airships and to make recommendations as to their future design and construction."

To the committee the Science Board appointed: William F. Durand, Professor Emeritus of Stanford University, as chairman; Profs. Alfred V. de Forest and William Hovgaard from the Massachusetts Institute of Technology; Profs. R. A. Millikan and Theodor von Karman of the California Institute of Technology; Prof. Stephen Timoshenko of the University of Michigan; Charles F. Kettering of the General Motors Corporation and Frank B. Jewett of the Bell Telephone Laboratories.

Last month they submitted a unanimous report on the "past and present" portion of their assignment. Excerpts:

"Can a reasonably safe and useful airship be designed, constructed and operated and if so under what conditions? . . . First regarding safety in other means of transport. Nothing is entirely safe. . . . Yet . . . we do not contemplate giving up any of these means . . . we have given special attention to the record of the principal (airship) casualties. . . . Our study leads us to the belife that, with the lessons which have been drawn from them, and with the general advance in our understanding of the technical problems of airship design, construction and operation, the probability of a repetition of such casualties under like conditions should . . . be reduced to a point which . . . may be considered as acceptable in comparison with the promise of useful service. . . .

For the big rigid types this immunity from further casualty would require:

1. Design in the light of the most careful and thorough analysis of world experience.
2. Design in the light of the most recent studies and advances in typical airship structures.
3. Specification of aerodynamic loads . . . based on: (*a*) Approved aerodynamic theory . . . (*b*) Results of wind tunnel research and experience with actual ships. (*c*) Recent advances in meteorological science. . . .
4. Construction under conditions . . . which will insure . . . the qualities and characteristics contemplated in the design.
5. On completion of the structure itself, opportunity for operation under some cooperative arrangement between builder and owner . . . sufficient to permit the taking of strain gage readings at all critical points . . . up to and including conditions approaching the most severe to be anticipated . . .
6. When delivered for service, operation by a personnel thoroughly trained and experienced in the handling of airships . . . (assisted by) an experienced aerologist trained in the more recent advances in meteorological science. . . .

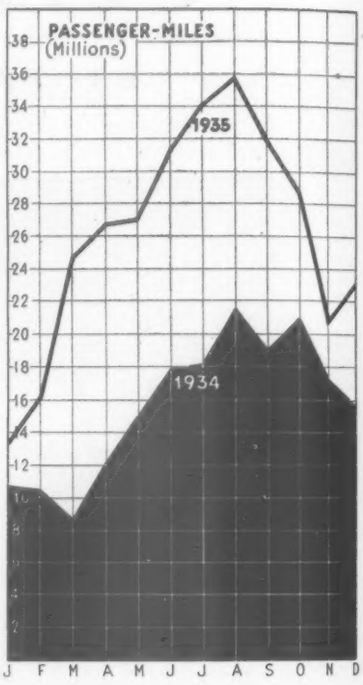
Regarding airship design and construction at the present time . . . compared with the situation in 1928, . . . there is a large amount of additional actual experience available. . . . This includes . . . experience with the Akron and Macon for 3,257 hours . . . the experience of the Graf Zeppelin . . . during the past six years aggregating some 11,868 hours. . . .

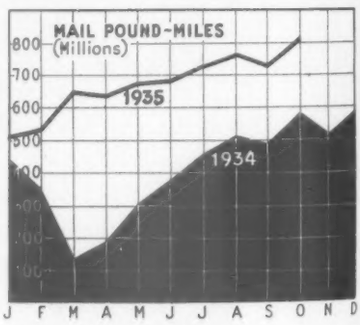
In view, therefore, of our expressed opinion, it is our recommendation that the Navy Department should continue with a positive carefully considered program of airship construction, including non-rigids and rigid ships of small or moderate size as service requirements might indicate, and extending to a ship or ships of large size, to the point, at least for the latter, of furnishing ground for definite conclusions regarding (their) capacity for useful naval service. . . .

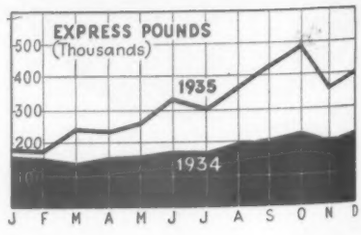
We further recommend most strongly

Traffic

Latest available statistics from the Bureau of Air Commerce and the Post Office Department—Domestic airlines only

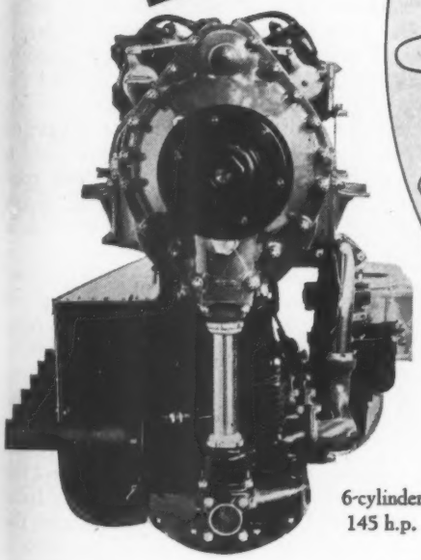




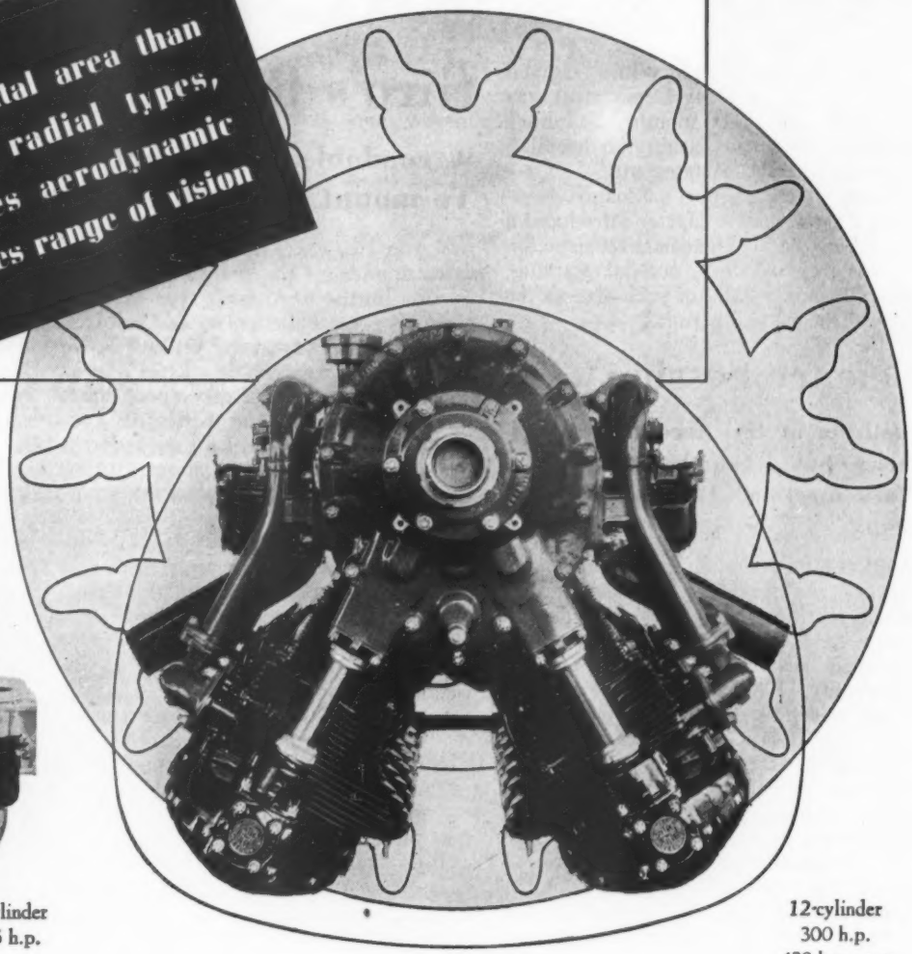


RANGER AIRCRAFT ENGINES

60% less frontal area than corresponding radial types, greatly reduces aerodynamic drag...increases range of vision



6-cylinder
145 h.p.



12-cylinder
300 h.p.
420 h.p., not
for export

THE RANGER ENGINE is the answer to Aviation's demand for an efficient, smooth-running, in-line power plant. . . . Underhead camshafts actuate the valves of the inverted Ranger Cylinders, without push-rods, an arrangement which does away with the need for regular valve adjustments and provides a constant bath of oil for the entire valve mechanism. . . . Exceptional smoothness derives from the inherent balance of the 6- and 12-cylinder in-line designs. The Fairchild patented Protector Drive, a flexible auxiliary shaft, drives the magnetos, super-charger, pumps and extra accessories, insulating them against shock and vibration. As a result, a wholly new reliability is given these units. . . . Ranger Engines are built for dependable service over periods of 400 to 500 hours without adjustment and with no attention except for gas and oil. Write for complete literature.

RANGER ENGINEERING CORPORATION, Farmingdale, L. I., N.Y. *Division of Fairchild Aviation Corporation*

FAIRCHILD

AIRPLANES · CAMERAS · INSTRUMENTS · AERIAL SURVEYS · RANGER ENGINES

that the first large airship built under such a program should, at least for a time, be considered not an adjunct to the Fleet but rather a flying laboratory or flying training ship, not only for extensive technical observations of the structure under operating conditions, but also for enlarging our knowledge regarding the best conditions of service for such vessels, and, as well, for giving opportunity for the training of officers and crew.

Just how much weight would be given the report by the Navy Department was not apparent last month, Secretary Swanson, ill in a Washington hospital, refusing to issue a statement.

Soon after the report's issuance, however, Representative Harter introduced a bill calling for the immediate construction of two rigid airships, one for training, one with metal hull "of such size as the state of the art will permit."

Science Session

Institute of the Aeronautical Sciences holds fourth annual New York meeting. Martin new president.

AN AVERAGE attendance of 150 members marked the three-day annual meeting of the Institute of the Aeronautical Sciences held Jan. 29-31 at the Pupin Physical Laboratories of Columbia University. Following their now traditional pattern—numerous short papers in morning sessions, broad afternoon discussions of basic subjects—the daily programs proved stimulating and informative. Outstanding were the afternoon discussions of recent power plant trends, of aerodynamic progress, of researches into the problem of stratosphere flight.

On the afternoon of the first day the members went into business session to elect officers for the coming year. Results: Glenn L. Martin succeeds Donald Douglas as president. Vice-presidents for the coming year are Dr. George W. Lewis, Claire L. Egvedt, Dr. Clark Millikan, Eugene E. Wilson and E. E. Aldrin. Sherman M. Fairchild will serve as treasurer. Maj. Lester D. Gardner will continue as secretary.

During the evening of the final day members met for the annual dinner at Columbia's Faculty Club. There Secretary Gardner had excellent news to announce: Following the example of the late Sylvanus Albert Reed who willed the Institute $10,000 to perpetuate the annual Reed Award (see AVIATION People), an anonymous friend of the Institute has set aside aeronautical securities to a present value of $500,000 which upon his death will become the property of the Institute to administer for aeronautical research.

Giro's Return

A roadable, direct-control, wingless nears completion. To mount jump-off device later.

FOR over two years now, ever since Pitcairn announced the suspension of production on the fixed-wing type of autogiro, progress bulletins on the research program underway at the Willow Grove factory have been rather scarce. A year ago AVIATION described the small direct control cabin giro the Autogiro Corporation of America has used for a trial-horse in developing direct (tilting rotor) control, and jump take-offs. In December we gave a detailed description of the Kellett direct-control hub mechanism. We have also carried a description of the concurrently developed Kellett direct-control giro delivered to the Air Corps.

But not until last month were releases obtainable on the details of the new roadable, direct-control giro nearing completion for the Bureau of Air Commerce which, when equipped with the jump take-off device, promises to be the prototype for the next giros to be put into commercial production.

It is indeed a far cry from the old fixed-wing type. The principle underlying its design must await fuller treatment than we can give it here. What follows is merely a stem to stern description of the revolutionary little craft.

A small steel-tube cabin fuselage seating two persons side by side, its overall length (20 ft. 7 in.) somewhat shorter than that of a corresponding airplane. No trace of wings. The empennage control surfaces reduced to fin and stabilizer assembled into a single cellular unit, and a small auxiliary rudder.

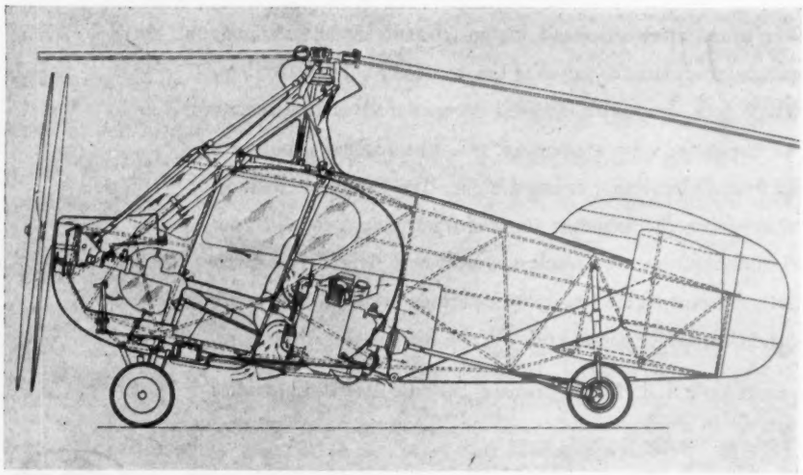
The engine, a 90 hp. Pobjoy Cascade, is mounted inside the cabin behind the seat where it is cooled by a Sirocco fan fed through louvres. From the rear of the engine an over-running gear and a clutch mechanism drives a shaft connected to the single rear wheel. From the front of the engine another shaft runs forward between the seats to a small selector gear box, which permits the engine to be: (1) disconnected from the propellers (two of them rotate in opposite directions to eliminate torque); (2) connected to the propellers alone or (3) connected to the rotor alone.

On the floor of the cabin are pedals through which the pilot can control the two fully steerable and brakeable front wheels. From the cabin roof hangs the control stick through which the rotor is tilted and which has a motorcycle-type grip-throttle connected with the engine.

Details of the jump take-off mechanism are not yet available, but it consists of a hydraulic device which twists the blades to a zero-lift incidence, permitting the rotor to be speeded to a much higher rate of revolution than required for normal flight. Suddenly restoring a positive-lift pitch causes the fly-wheel energy thus stored in the rotor to lift the ship 20 to 30 ft. vertically from a standing start.

Above the cabin three blades join to the hub which is supported on a two-strut wire-braced pillar. They can be easily folded and cradled on the empennage.

Tentative specifications: Landing speed (under full positive control) zero. Top speed (on the highway) 25 m.p.h. Top speed (in the air) 115 m.p.h. Gross weight 1,350 lb. Storage dimensions 24x7x8.



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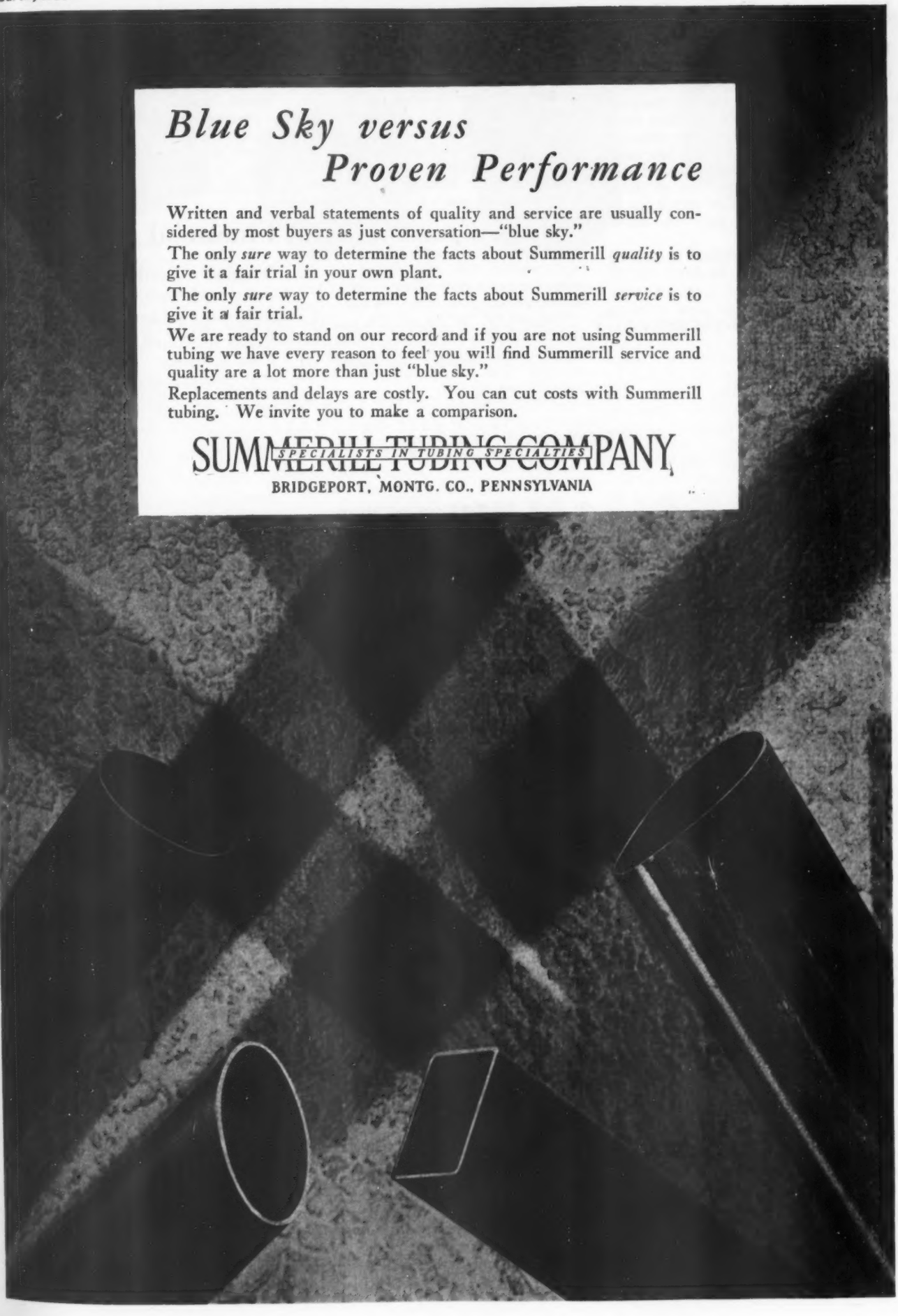

Menasco, Ryan Busy

Join Southern California boom with order backlogs.

WITH all the big military and transport manufacturers on the West Coast forging ahead to new peace-time peaks of activity, some of the smaller coast units have seemed lagging in comparison.

Last month, however, two of them, Menasco of Los Angeles and Ryan of San Diego, climbed onto the bandwagon.

A. S. Menasco announced a backlog of commercial orders on hand for 75 engines representing a total of more than $90,000 of business, and standing approximately equal to the entire 1935 production.

Outstanding Menasco users: Hammond (pushers for the B. of A.C.); Lockheed (feederline transports); Brown (racers); Crusader Aircraft (twin-engined Crusaders); and the Ryan (ST).

The last named made quite a splash last month on its own account—the announcement of the sale of fifteen of its neat dural-fuselaged sport trainers to W. H. Irwin, Atlanta, Ga., operator. Five were delivered immediately. Five were due to follow before the month's end, production of the rest was to be rushed for March and April. For these and other orders on hand Ryan has ordered 25 Menascos for the first half of the year.

Maneuvers

Navy, Marine and Air Corps squadrons work at problems.

A WIDESPREAD program of aircraft exercises marked the service month just passed.

In New England the GHQ put 50 bombing, attack and pursuit planes through two weeks of intensive maneuvers under severe winter conditions. Bombing attacks on Mitchell Field, on Boston and on Burlington, Vt., were carried out from Concord, N. H., against pursuit defense from those bases. More important, the Corps found its ski equipment, its engine heating technique, and its service squadrons encouragingly efficient despite the handicaps of the near zero temperature.

Over the Caribbean, 50 Marine Corps planes continued exercises from bases at Puerto Rico, on the Island of Culebra and at St. Thomas in the Virgin Islands until mid-February, then began the long return flight to their home base at Quantico.

Thirty-one of the Navy's patrol planes under the command of Rear Admiral F. J. Horne, who accompanied them on the tender Wright, took off Feb. 7 for a week's maneuvers off Colombia and Ecuador and around the Galapagos Islands.

On Feb. 10, the fleet forces at San Diego, including the carriers Lexington, Saratoga and Langley, moved out to sea for a five-day exercise off the Californian Coast.

In Washington the Navy Department announced the launching of the 20,000 ton carrier Yorktown on April 4, the launching of the Enterprise in August. Both are under construction at Newport News, Va.

Meanwhile the House of Representatives sent the Senate a $543,342,000 Army appropriation bill, the record in the country's peace-time history. Most important aeronautical item: An authorization of $45,540,177 for aircraft procurement, some $16,000,000 more than the corresponding figure for the present fiscal year. The number of planes to be bought is set for 565.

Buffalo Shuffle

Consolidated sub-contracts work to Bell Aircraft Corporation.

LAST YEAR when Consolidated Aircraft moved across the continent to San Diego, the city of Buffalo which had been its home for a decade suffered considerable chagrin.

Then Lawrence D. Bell and Ray P. Whitman, former Consolidated executives, enlisted local capital in a move that made up for part of the disappointment. Forming the Bell Aircraft Corporation, they announced they had leased a portion of the vacant Consolidated plant and would employ at least a portion of the workmen Consolidated could not afford to move to the Coast. Soon they had secured an $80,000 contract for Air Corps experimental work.

Last month they announced a further contract. To help speed production on its big Navy patrol boat order, Consolidated had farmed the construction of 73 sets of P3Y1 outer wing panels back to Bell Aircraft. Representing $800,000 of business, the new order will require an immediate expansion of the Bell plant into a full half of the old Consolidated factory, a Bell payroll of 500 workmen.

Mid-West Reports

Curtiss-Wright, Cessna and Beechcraft items.

FEB. 1 the Curtiss-Wright Airplane Company of Lambert, Mo., announced it would increase its force of employees from 90 to 250 men. Curtiss-Wright export had ordered ten 175 hp. primary trainers for immediate production.

Cessna announced the appointment of F. W. D. Grant, manager of the Surrey Air Service and S. L. Turner, British pilot, as London agents for its aircraft now in active production. As a first order the new agents took delivery last month of a C-34 which Turner plans to enter in the Egyptian air races March 16.

Meanwhile Beechcraft ferried one of its 420 hp. models to New York where it was taken down and crated for shipment to France. Purchaser: Rene Drouillet, French commercial pilot.

Financial

Douglas, Northrop, Lockheed, United Aircraft, North American and Irving all report 1935 profits.

IRVING AIR CHUTE COMPANY, INC., of Buffalo, reports for 1935 a net profit after charges and federal taxes of $336,276. The corresponding figure for 1934 stood at $119,799.

North American Aviation, Inc., recently installed in a new factory at the Los Angeles Municipal Airport, reports for 1935 a net profit of $14,788 after depreciation and after including an accounted profit of $33,205 realized from the sale of securities. A net profit of $206,922 after a security sale profit of $1,244,280 was reported for 1934.

Recording the best year in the company's history, the annual statement of the Douglas Aircraft Company reports: net profits of $1,262,912 ($2.70 a share) for 1935; an operating profit of $1,511,834 compared with an operating profit of $195,393 in 1934; an increase in assets of $1,048,792 to a total of $6,033,190; 1935 sales of $7,391,896; unfilled orders of $16,800,000.

The Northrop Corporation, 51 per cent Douglas owned, was listed as carrying unfilled orders of $4,900,000 and showed 1935 sales of $1,199,217 with a net profit of $172,232.

Lockheed Aircraft Corporation reports for the year 1935 net profit after depreciation, taxes and charges of $217,986 (49 cents a share) compared with a net loss of $190,891 for 1934.

United Aircraft Corporation and subsidiaries report for 1935 net income after taxes and charges of $434,635 (20 cents a share) compared to a net loss in 1934 of $27,027. Unfilled orders totalled $15,804,052 against $7,533,662 at the end of 1934. Included in the year's profit were $98,598 from royalties, $539,500 proceeds from sale of design and manufacturing rights, and $399,502 profit from the sale of Pan American Airways stock.

Late in January the United Board of Directors called a special meeting of stockholders for March. Object: To pass on a proposal to issue 3,000,000 shares of $5 par value each to raise capital for increased production, and to enlarge plant facilities at Bridgeport for Sikorsky, at Hartford for Hamilton-Standard and Pratt & Whitney.

Front View
THERMOCOUPLE
INDICATOR

Front and Back View
4-POSITION SWITCH

Front View
CARBURETOR AIR
TEMPERATURE INDICATOR

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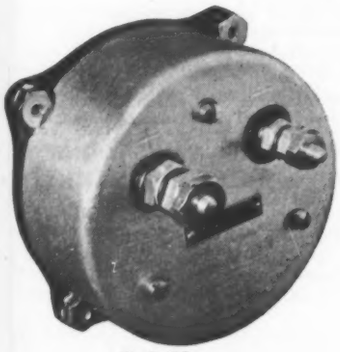
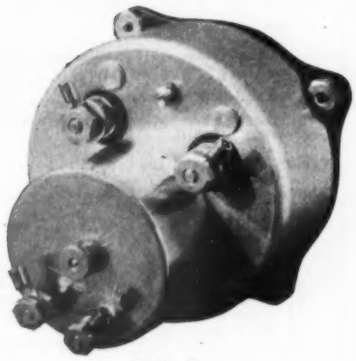


Back View
THERMOCOUPLE
INDICATOR

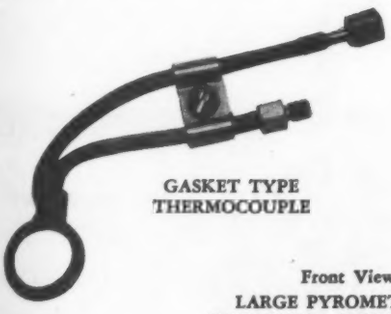


Back View
CARBURETOR AIR
TEMPERATURE INDICATOR

Front View
PORTABLE POTENTIOMETER

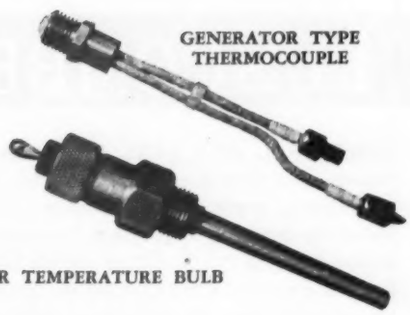
Front View
18-POSITION SWITCH

Back View
18-POSITION SWITCH



GASKET TYPE
THERMOCOUPLE

Front View
LARGE PYROMETER OR
RESISTANCE THERMOMETER



GENERATOR TYPE
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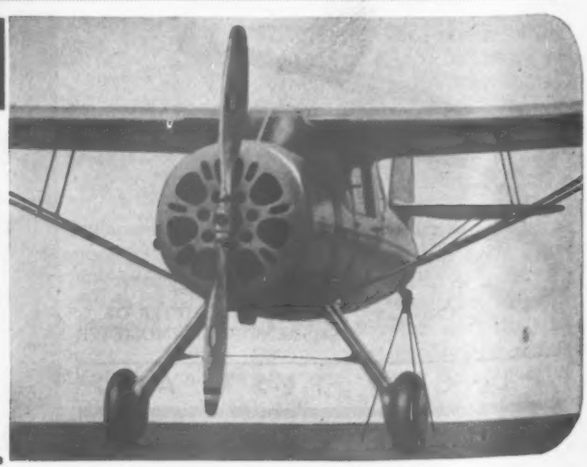

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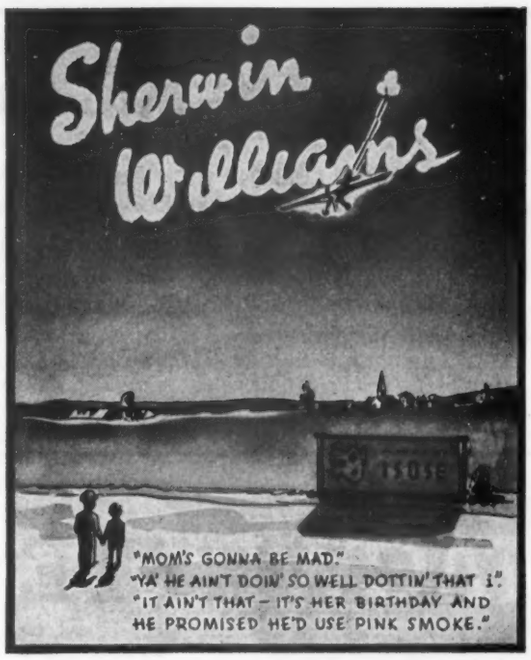
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Schools, Services, and Airports

● ALABAMA—BREWTON and MONROEVILLE airports have been approved by the Bureau of Air Commerce for allotment of $17,900 and $24,268, respectively, for WPA improvements. The Monroeville field has already been graded, and a concrete circle constructed in its center. . . . With headquarters at the BIRMINGHAM Municipal Airport, W. H. Scruggs will handle sales of Porterfield airplanes in fourteen southern states. He has engaged Ed Horton as pilot. . . . TUSCALOOSA, DOTHAN, and TUSCUMBIA are planning early enlargement and improvement of their airports. . . . R. L. Leonard has offered 40 acres of land within 5 miles of JASPER for use as an airport. . . . The TUSCALOOSA Commission Board will purchase a site for a municipal airport at UNIVERSITY. Present plans call for moving the shop equipment of the University of Alabama School of Aeronautics to the new field when it is completed.

● ARIZONA—A fleet of planes of the PHOENIX Flying Club, led by Capt. Edward Pettis, flew to Nogales for one of its monthly air picnics early in February. . . . A $92,915 improvement project for DOUGLAS International Airport has been approved by the Bureau of Air Commerce. It now awaits approval by the state WPA. . . . Caleb O. Rice, of DOUGLAS, has been elected state governor of the National Aeronautic Association for 1936. . . . PHOENIX is considering the appropriation of about $7,500 to secure between $50,000 and $100,000 from the WPA for oiling of runways at Sky Harbor, the municipal airport. TUCSON has received $100,000; SPRINGERVILLE, $17,000; NOGALES, $23,000; PRESCOTT, $12,000, and ST. JOHNS, $1,700.

● ARKANSAS—The WPA has granted $75,191 for the construction of two 3,000 ft. runways at LITTLE ROCK Municipal Airport. The city will add $56,430 to this, which will include 16,000 cu.yd. of crushed stone. The State Highway Department will construct about 2 miles of roads in the vicinity of the field. . . . LITTLE ROCK Municipal Airport Manager S. A. Franklin, ill for several weeks at Hot Springs, returned to his job in good health in January.

● CALIFORNIA—The Boeing School of Aeronautics, OAKLAND Municipal Airport, placed 111 graduates in jobs during the year 1935, according to T. Lee, Jr., general manager of the school. . . . Curtis-Wright Technical Institute at Grand Central Air Terminal, GLENDALE, has added a course in aircraft metal fabrication to its curriculum. The course will take 300 hours. Instructor: H. E. Horn, formerly with Western Air Express, Douglas Aircraft, Airplane Development Corporation. . . . Douglas Ornstein, of BEVERLY HILLS, has bought a 125 hp. Ryan S-T-A. He received his flying instructions at Eddie Spencer's School, SANTA MONICA, where he will base his plane. . . . John H. Dougherty, pilot for the sheriff's department of San Diego County, has offered to give a free aviation training course to SAN DIEGO boys at the Knights of Columbus headquarters. . . . Norman R. Breeden, who has recently taken over the operation of the SAN JOSE Airport, will start his activities with a J-6-5 Travelair, and plans later to add a training plane and a plane for charter work. Ernest Smith will be in charge of motor repairs at the field. . . . The lease of HOLLISTER Airport has been taken over by R. O. Clarke, Los Angeles. He will bring five planes to the field and will do commercial flying and crop dusting. . . . Ground is being cleared at Benton Airport, REDDING, for a 400 ft. extension of the runway. Placer Street will be moved north, leaving the field unobstructed. . . . Members of the KERN COUNTY Aero Club, headquartered at Kern County Airport, have purchased a new Taylor "Cub," which will be used for instruction. Thomas F. McCart is president of the club.

● COLORADO—Colorado members of the National Aeronautic Association have elected Major Virgil Stone state governor for 1936. Major Stone is commanding officer of Lowry Field in DENVER. . . . The Air Transport Division of the State Planning Commission, cooperating with the State Aeronautics Commission, has launched a comprehensive aviation development program for the state. The plan calls for the establishment of more than 30 new airports and emergency landing fields, improvements to at least eighteen existing fields, and roof-marking of nearly 300 buildings throughout the state. The program is expected to take three years. Among towns where the commission plans to establish new airports are WRAY, FORT MORGAN, DEERTRAIL, ESTES PARK, KREMMLING, MEEKER, and SPRINGFIELD.

● CONNECTICUT—The WPA has provided $318,457 for improvements at Brainard Field, HARTFORD. A new administration building will be erected which will include an electric control room with facilities for controlling flood, signal and border lights. . . . Flying instruction has been added to the curriculum of the Charles B. Jennings Evening School, NEW LONDON. Howard Alsop will be the flight instructor. Richard Markey is chief instructor of the school. . . . All transport and student flying at the DANBURY airport has been banned. Only private flying by ships kept at the field, or by visiting planes, may be done. The field is municipally owned, but is leased for a period of twenty years. Mason Jennings, who has a flying school utilizing three planes at the field, is expected to seek another location for his activities.

● DISTRICT OF COLUMBIA—The dispute over the use of Military Road at WASHINGTON-HOOVER Airport is still unsettled. Although Samuel J. Solomon, manager of the airport, threatened to remove the guards along the road by Feb. 15, a compromise agreement was reached by that date. The guard will be continued pending legislation by Congress to determine whether or not the road shall be closed. As the road is public property, congressional action is required before it can be closed to public use.

● FLORIDA—At Halderman-Elder Field, LAKELAND, traffic is now regulated by the Department of Commerce rules. The airport, managed by Dick Bentley, is having an eighteen-plane hangar erected by the WPA. . . . 38 students have registered for a course in aviation at the University of Florida, GAINESVILLE. The course is a WPA project under the direction of C. R. Coachman. . . . To commemorate the first commercial flight from ST. PETERSBURG to TAMPA, 22 years ago, Sidney C. Brown, president of the Tampa Chapter of the National Aeronautic Association, sponsored an air show in February which drew 15,000 spectators. . . . The City Council of WEST PALM BEACH has voted to build an airport there with WPA funds. . . . George B. Cluett has organized the Rearwin Flying Service at SARASOTA to give flying instructions and engage in charter work. Guy Ham, Jr., is in charge, with the assistance of Nelson Jones as airplane and engine mechanic. For student instruction the company will use a Rear-

win Sportster while for charter trips a 4-place Stinson will be used. Offices are being built at the north end of the hangar.

● GEORGIA—The SAVANNAH chapter of the National Aeronautic Association is planning to sponsor an air race at the dedication of the reconstructed Hunter Field. The work is expected to be finished next fall. The $63,253 improvement program calls for construction of a concrete and steel hanger 180x120 ft. and three sand and asphalt runways. The main runway will be 3,000 ft. long and 150 ft. wide.

● IDAHO—The BURLEY City Council has agreed to apply to the WPA for a grant of $14,465 for improvements at Burley Municipal Airport. If the application is approved, the field will be graded and drained and a 60x60 ft. concrete-floored hangar will be erected. . . . Subject to WPA approval, the Bureau of Air Commerce has approved airport improvement projects for the following towns: ABERDEEN, $9,285; GOODING, $6,036; OSBORN, $16,903; PRESTON, $9,287; ST. ANTHONY, $19,643.

● ILLINOIS—Parks Air College, EAST ST. LOUIS, has spent more than $40,000 in an expansion program in the past fifteen months. This has included remodeling of buildings and purchase of new equipment. . . . Manager Fred Valentin, of MARION Airport, spoke late in January before the Marion Rotary Club. His topic was "Aviation and the Equipment of Airports." Aviation motion pictures were also a feature of the meeting. . . . The CHICAGO City Council Aviation Committee is seeking a way to rid Chicago Municipal Airport of bisecting railroad tracks. It is believed that if the Board of Education, which owns the airport site, would give the railroad a new right of way along one edge of the field, the tracks could be moved at a total cost of about $300,000.

● INDIANA—Baer Field, FORT WAYNE, will have a radio range beacon and boundary lights installed as a WPA project. . . . Because city commissioners of SOUTH BEND have failed to supply sufficient money, ST. JOSEPH County Commissioners are considering the purchase of Bendix Municipal Airport without the cooperation of the city. They hope to be able to purchase the 450 acres for $195,000. . . . With Lloyd Pierce's purchase of a Waco, Baer Field, FORT WAYNE, has fourteen planes in its hangar. . . . H. Weir Cook, INDIANAPOLIS, has been re-elected state governor of the National Aeronautic Association.

● IOWA—The DES MOINES City Council has granted Art Thomas, manager of Des Moines Municipal Airport, civil service rights to the job because of the length of his service. He has been at the airport for six years.

● KANSAS—The Naval Reserve Aviation Base at Fairfax Airport, KANSAS CITY, is doubling its hangar space. The base has been using the third hangar from the north end of the field, the city paying $300 rental. Under the new arrangement the two hangars at the north end of the field will be used, the city paying $300 of the rent and the Navy paying an additional $200 and $15,000 will be spent remodeling the hangars.

● KENTUCKY—Harry Boggs, manager of the MIDDLESBORO Airport, is sponsoring the formation of an aviation club there. . . . Erle McGuffey and Ernest Welch of the LEXINGTON Air Taxi Company are fostering establishment of a "feeder" line operating from CINCINNATI via LEXINGTON to MIDDLESBORO, KNOXVILLE and CHATTANOOGA. If plans go through, the line will be known as Cumberland Airlines, Inc.

● LOUISIANA—The Aviation Committee of the NEW ORLEANS Association of Commerce, acting under the chairmanship of Pendleton E. Lehde, will work for the establishment of an air mail, passenger and express line between New Orleans and Merida, capital of the state of Yucatan, Mexico.

● MAINE—The Airmobile Aircraft Co., of LEWISTON, has been incorporated for $30,000. Henry M. Dingley is president and treasurer, and with Lucille M. Dingley and Ora M. Dingley, comprises the board of directors. Mr. Dingley has a private field near his home at Young's Corner, AUBURN.

● MARYLAND—The state PWA has approved an application for $1,200,000 to complete the municipal airport project at BALTIMORE. The city already has an $800,000 balance from a PWA airport loan. The field still needs 3,800,000 cu.yd. of sand fill. If the application is approved in Washington, work will start early in the spring. . . . The mayor and City Council of HAGERSTOWN have approved construction of a 100x100 ft. hangar to cost $15,000. The plan requires approval of the Fairchild Aviation Corporation, which would pay the city rental equivalent to 6 per cent on the city's investment for a period of five years.

● MASSACHUSETTS — The second annual New England Intercollegiate Flying Conference, meeting in February at AMHERST College, voted to change its name to the Association of New England College Flying Clubs. The Amherst College delegates donated a propeller to be competed for as a challenge trophy. The conference voted to hold its second New England intercollegiate air meet at NORTHAMPTON, May 9. . . . Irving Johnson and Frank P. Gallant have organized a company at BOSTON Airport for the emergency supply of tools and parts

LADIES IN WAITING

for their turns at flight instruction. Students of the Lake Erie College for women (at Painesville, Ohio) lined up before the college's Taylor Cub. The course offered them includes ground-school, elementary engineering, and lectures by pilots and Weather Bureau officials. Philip A. Meinke is their regular instructor.

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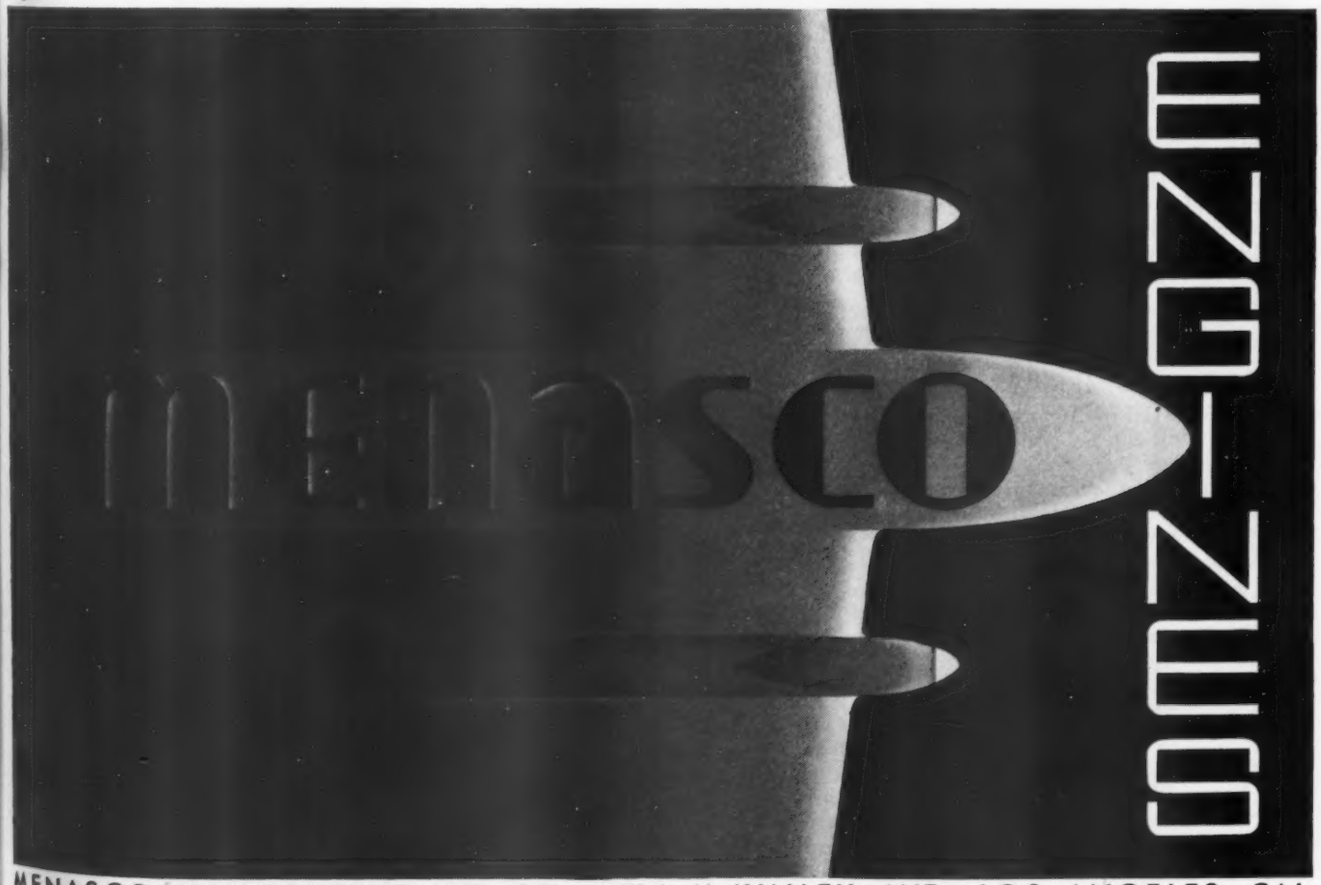

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needed by stranded fliers in the New England area. The company will be known as the National Aviation Supply Company. Johnson is president and Gallant, a flying instructor and engine mechanic, vice-president. . . . Mayor Gillis, of NEWBURYPORT, is urging condemnation proceedings to secure municipal possession of land on Common Pasture for use as an airport. Plans call for three landing strips each 2,650 ft. long and 300 ft. wide. The hangar will be located at the intersection.

● MICHIGAN—The WPA is conducting a free aviation ground school course at LANSING. The curriculum includes construction, maintenance, elementary design, theory of flight, engines, navigation and meteorology, and will take thirteen weeks. Instructor: John F. Matthews. . . . The State Board of Aeronautics has recommended a $194,000 program to enhance the safety of flying in the State. The program calls for the establishment of lighted emergency landing fields, the erection of airway beacon lights, course lights, radio range stations, and a teletypewriter weather reporting station. . . . Giles Airport, PONTIAC, has received a State commercial license. The field is owned by Charles E. Giles, who is using his four planes for the instruction of nine students. . . . Neil G. Brackstone, PONTIAC Municipal Airport manager, was able to show a decided upturn in business at the field during 1935 in his annual report. Students increased about 500 per cent, and income nearly doubled. . . . Land O'Lakes, PONTIAC Municipal Airport, is planning to buy a low-wing Aeronca for training advanced students. . . . Business at ANN ARBOR Municipal Airport in 1935 showed a distinct gain over that for 1934. Ninety-eight students received flying instructions, fourteen making their first solo flights. Students' flying time increased from 409 hours in 1934 to 817 hours in 1935. . . . Ralph Helgeby has been elected president of the FLINT Pilots' Club.

● MISSISSIPPI—An air show was planned for early February at JACKSON Municipal Airport, which would feature parachute jumps and stunt flying. . . . The mayor and Board of Alderman of NEWTON are planning to purchase O'Keefe Airport, a 90-acre field built in the fall of 1934. When the city acquires title, it is planned to spend over $12,000 for improvements. . . . A $116,000 WPA grant for Key Field, MERIDIAN, will provide for paving runways, installing lights, and enlarging the available area.

● MISSOURI—The Air Board of the ST. LOUIS Chamber of Commerce, under the chairmanship of George B. Logan, is studying the air laws of various States having aviation commissions with a view to enactment of similar laws in Missouri. . . . Paving of runways at SPRINGFIELD Municipal Airport is being held up until the city can raise $30,000 towards the cost of such a movement. . . . Dr. John D. Brock, KANSAS CITY, has been elected both vice-president of the National Aeronautic Association and the State governor of the Association. . . . W. W. Kratz, of the ST. LOUIS Flying Service, Inc., reported the sale of 44 planes, bringing a total gross income in excess of $100,000 in 1935. The company anticipates a 50 per cent increase in business during 1936.

● MONTANA—The BILLINGS Airport Commission has recommended a $75,000 hangar and water system expenditure for the airport. The City Council is issuing a petition for a special bond issue election next April. . . . The City Council of RED LODGE has voted to supply $285 to add to the $1,165 furnished by the State Airport Association for the removal of electric light poles and transmission lines across the Red Lodge airport site. $10,000 has already been spent on the airport.

● NEBRASKA—NORTH PLATTE City Council has ordered a survey of North Platte Airport preparatory to application for a WPA improvement fund. It is planned to construct concrete runways and a larger hangar.

● NEVADA—WASHOE COUNTY Commissioners are considering construction of an airport adjoining the United Airlines field south east of Reno. If the county will buy the necessary 85 acres of land and contribute $14,000 for material, the WPA will supply $114,000. . . . Pete Ergenbright is planning to open an aviation school at ELY, starting as a ground school and later giving flying instructions.

● NEW JERSEY—OCEAN CITY has contributed $11,004 out of a total of $76,000 being spent by the WPA at Clarke Field. This will provide for the grading of two runways and construction of an 80x80 ft. hangar. . . . Members of the Rutherford High School Aviation Club visited NEWARK Airport early in February. . . . Bill Sigler discussed developments in the light plane field before a meeting of the Aviation Club of MONTCLAIR High School late in January. Sigler is connected with the Casey Jones School of Aeronautics.

● NEW YORK—At a meeting in ALBANY in January, representatives of aviation in New York State formed the New York State Aviation Association to foster uniformity of state laws, and urge the vesting of power to enforce state laws that are identical with federal regulations in the state police. The delegates approved the establishment of an unpaid State Aviation Commission and went on record as opposing all State taxation on aviation. Its general policy will be to coordinate various bodies controlling or regulating aviation. . . Standard Aircraft Equipment Co., Roosevelt Field, MINEOLA, has added 200 sq.ft. to its laboratory and shops. The company specializes in the installation and servicing of aircraft instruments . . . Roosevelt Aviation School, Roosevelt Field, MINEOLA, has taken additional floor space and added to its equipment, according to Paul E. Gillespie, director, and Major Alford J. Williams, technical adviser. . . . $30,640 is being spent by the WPA on improvement work at SCHENECTADY COUNTY Airport. The project includes leveling, application of gravel surfacing on the runway extension, drainage, and concrete hangar aprons.

● NORTH CAROLINA—The ASHEVILLE City Council has approved a plan for the city to acquire a half interest in the ASHEVILLE-HENDERSONVILLE Airport. The city will pay $15,000 for its share. HENDERSONVILLE and HENDERSON COUNTY will acquire title to the other half of the 123-acre property, which will then be eligible for a $100,000 WPA grant.

● NORTH DAKOTA—Edwin M. Canfield, WILLISTON, reported in January that he and his wife Dorotha had shot from the air 1,152 coyotes from their Stinson Reliant. They operate the Canfield Flying Service, Inc., at Canfield Airport. Canfield has equipped his plane with special narrow steel skis of his own design.

● OHIO—DAYTON citizens have raised by subscription nearly $65,000 for the purchase of the DAYTON Municipal Airport. This makes it eligible for $673,000 from the WPA. . . . W. Bryan Little, manager of Little-Greiner Flying Service, Inc., at SPRINGFIELD Municipal Airport, is conducting a ground school for his flying students. For practical instruction, one of Little's planes has been taken apart and the students are overhauling it and putting it together. . . . Ernest C. Hall, who has operated a flying school at Hall Airport, East of WARREN, for a number of years, has been appointed Ohio's Assistant Director of Aeronautics. . . . The TOLEDO Aviation Club and the Toledo Gliding Club are cooperating with Von B. Hilbert to purchase a small plane, to be owned cooperatively, for flight training. . . . Erie Isle Airways Co. has a new four-passenger cabin plane for the transportation of fishermen between PORT CLINTON Airport and the Erie Isle Airways Airport at PUT-IN-BAY, a five-minute trip by air. Milton Hershberger is the company pilot.

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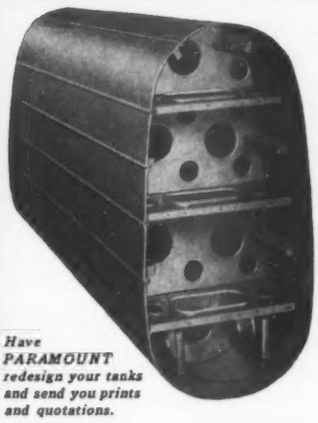

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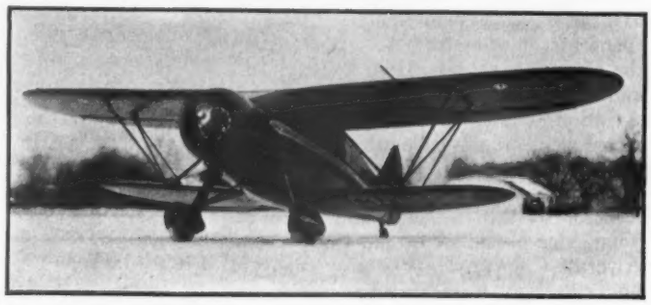

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● OKLAHOMA—The MUSKOGEE City Council has provided $5,000 for drainage, installation of runways and a hangar at MUSKOGEE Municipal Airport. . . . TULSA has been granted $66,225 by the WPA for construction of runways at the municipal airport. . . . The WPA will construct an $80,000 hangar at OKLAHOMA CITY Municipal Airport.

● OREGON—PORTLAND voted in January for a $300,000 special bond issue for purchase of a site for a combination land and sea port. The WPA has given assurances that up to $3,000,000 will be spent for development. . . . Students of the Commercial Aircraft Company, Inc. and the Oregon Institute of Technology's Aviation School, Swan Island, have completed work on a 3-place cabin monoplane of their own design. It was built under the supervision of Eugene Larson, instructor of the Institute, and Vern St. John, vice-president of the Commercial Aircraft Company. It is now ready to undergo flight tests. . . . The WPA and the State Board of Aeronautics are planning a ground school course at OREGON CITY. Classes will be held twice a week, and will be instructed by George R. Holloway. Other cities which will have similar ground schools are: PORTLAND, MARSHFIELD, BAKER, CORVALLIS, GLADSTONE, BORING, ROSEBURG, KLAMATH FALLS, EUGENE and MILWAUKIE.

● PENNSYLVANIA — The ALLENTOWN-BETHLEHEM Airport has received $40,000 from the WPA for grading runways. The money is part of a $151,000 total to be spent at the field. . . . The WYOMING VALLEY Flying Club added 30 new members at a meeting in February at WILKES BARRE-WYOMING VALLEY Airport. Officers: Anthony C. Janerich, president; Thomas Beany, vice-president; Jane Harrison, secretary, and William Klisch, treasurer. . . . Richard P. Rose of LAMPETER was awarded the annual trophy of the LANCASTER Aero Club late in January. The trophy is awarded to the local private flier with the greatest number of flying hours and who is adjudged to have done the most outstanding work in the interests of aviation. Rose's time was 76 hours, 25 minutes.

● RHODE ISLAND — Wings, Inc., which operates a passenger and charter service at the Rhode Island State Airport, HILLSGROVE, has purchased a 225 hp. Jacobs powered custom cabin Waco.

● SOUTH CAROLINA—The State Aeronautics Commission has decided to buy a plane, which will be available to all state departments for official business. The plane will be paid for from proceeds of the tax on aviation gasoline which are set aside for the support of the commission. . . . Beverly E. Howard has assumed ownership of the Hawthorne Flying Service and is the new manager of CHARLESTON's Municipal Airport.

● SOUTH DAKOTA — The SIOUX FALLS City Commission has been advised by the Mayor's Airport Committee to buy the 152-acre Sioux Skyways Airport. The Committee also recommended acquisition of sufficient land to the south of the present site to allow extension of the runways to 3,800 ft.

● TENNESSEE—The WPA will erect two new hangars at NASHVILLE Municipal Airport. They will cost $25,000 each and will be about 120 ft. square. . . . Edward Stork has replaced Webb Kimble as manager of Lovell Municipal Airport, CHATTANOOGA.

● TEXAS—Richard H. Chattin has taken a two-year lease on the EL PASO Municipal Airport. . . . Booth-Henning, Inc., has opened a plant at Love Field, DALLAS' municipal airport. The company is directed by Edward F. Booth, who has operated at Love Field for six years, and Harold P. Henning, who was formerly with the Texas Company. Equipment for repairing planes and instruments has been installed at a cost of $25,000.

● UTAH—CACHE County and the city of LOGAN are planning extension and improvements to two runways, erection of a beacon light and markers at LOGAN-CACHE Airport. The WPA has allotted $18,000 for the purpose.

● VERMONT—Exclusive of the regular daily mail planes of Central Vermont-Boston & Maine Airways, 208 planes landed at BURLINGTON Municipal Airport during 1935. Field manager Harold W. Pugh, with the assistance of Robert St. Jock, carried 1,910 passengers during the year.

● VIRGINIA—Aviation enthusiasts of HARRISONBURG have formed the Harrisonburg Aero Club to increase interest in aviation in the vicinity and to work for an airport for Harrisonburg. Officers: A. S. Turner, Jr., president; Warren Cline, vice-president; Edward Sullivan, secretary and treasurer. The club has seven active members and thirteen honorary members.

● WASHINGTON—Alan L. Blum, president of Northwest Air Service, Inc., Renton Field, has offered the field to SEATTLE for development as a municipal seaplane base for $30,000 in cash and city property appraised at $25,000.

● WEST VIRGINIA—The HUNTINGTON Chamber of Commerce has raised $5,175 out of a necessary $7,500 toward purchase of the HUNTINGTON-CHESAPEAKE airport site. If the money is raised, the site will be purchased and title transferred to the LAWRENCE COUNTY, Ohio, Board of Commissioners, so that application may be made for WPA funds for site improvement. . . . The Logan Flying Club, Wertz Field, CHARLESTON, has purchased a Taylor "Cub."

NEW AGENTS

for Stinson aircraft of Love Field, Dallas, Tex., are Booth-Henning, Inc. Left to right: Edward F. Booth, president; Miss Wayne Petit, secretary-treasurer; Hal P. Henning, vice-president and general manager. Last month Stinson sent its hundredth trimotor to Airlines of Australia, Ltd., started a "Fly Safely Campaign" to improve even further the excellent record of its Reliants.

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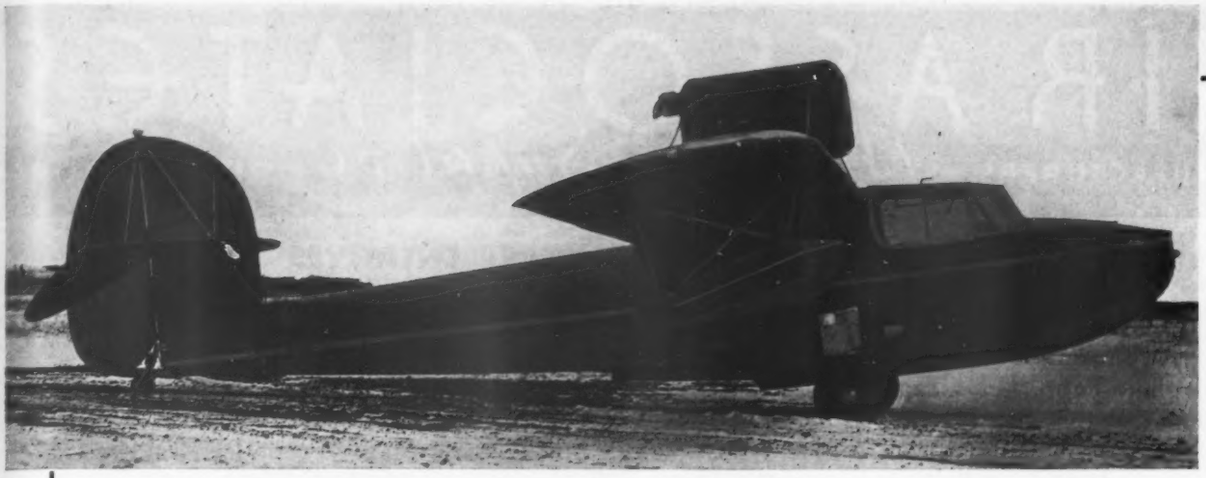

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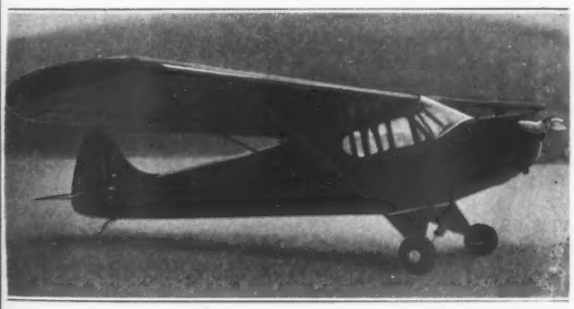

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Aviation People

• BRIG. GEN. WILLIAM LENDRUM (BILLY) MITCHELL, commander of the United States air forces in France during the World War, died Feb. 19 of a heart ailment.

An army officer since the Spanish-American War, Gen. Mitchell was one of the first in the service to be fired with the military potentialities of aircraft. In 1914 he was graduated from the Wright flying school. Three years later he was on leave in Spain when America entered the War, a circumstance which permitted him to enter active service almost at once. Serving first as assistant to GEN. MASON M. PATRICK in the task of building up an A.E.F. Air Service, Gen. Mitchell later succeeded to the top command serving as Chief of Air Service, Zone of Advance; Chief of Air Service, First Corps; Chief of Air Service, First Army and Chief of Air Service, Group of Armies. In the last named post he was instrumental in the development of an independent air arm, much along the lines of our present G.H.Q. air force. For his war work he was awarded the Distinguished Service Medal, the Croix de Guerre with five palms and several other decorations.

Returning to the United States after the Armistice, Gen. Mitchell was immediately named Assistant Chief of the Air Service. Filled with enthusiasm for the new arm he soon became an outspoken and tireless critic of the slow pace at which the country's air defenses were being developed. In 1921, after army bombers sank two once-German warships off the Virginia coast, he became more convinced than ever that navies were obsolete, that a separate air force was the only practical solution of our defense problems.

At the end of his regular four year tour of duty as Assistant Chief, he was not reappointed to that post. Instead he was reduced to his regular army grade of colonel and sent to Texas. He had been there only a short time when he issued his now famous statement charging the high command with "inefficiency, incompetency, criminal negligence and almost treasonable administration."

Mitchell was promptly court-martialed, found guilty and suspended for five years without pay or allowances. President Coolidge reviewed the sentence, upheld the suspension but restored the allowances and half the pay. Within two weeks Gen. Mitchell resigned from the army.

Brig. Gen. Mitchell

F. W. Caldwell

J. S. Ogsbury

D. C. Young

As a private citizen however he continued his bitter criticism of the development of American aviation.

Many credit him with having been the prime mover in most of the reforms carried out within the last few years in the organization and administration of the Air Corps that discarded him.

• "For increasing the effectiveness of aircraft through development and improvement of controllable and constant speed propellers," FRANK W. CALDWELL, engineering manager of the Hamilton Standard Propeller division of United Aircraft, was awarded the Sylvanus Albert Reed Award of the Institute of the Aeronautical Sciences late in January. A specialist in propeller design since 1916, Caldwell's brilliant work in that field has been internationally famous for a decade. In 1933 the Hamilton Standard Company was awarded the Collier Trophy for the controllable pitch propeller he had designed for them.

• JAMES S. OGSBURY has been appointed vice-president and general manager of the Fairchild Aircraft Corporation. Long prominent in the management of important business concerns in this country and Canada, Mr. Ogsbury comes to his new position from the post of vice-president and comptroller of Whitman and Barnes, Inc., of Detroit, manufacturers of high-speed drills. He will have charge of the activities of all the Fairchild subsidiaries which include the Fairchild Aerial Camera Corp., the Fairchild Aircraft Corporation, Fairchild Aerial Surveys, and the Ranger Engineering Corporation.

• One of the country's leading experts on airport and airplane lighting, a World War flier and an officer in the Ohio National Guard, D. C. YOUNG died Jan. 18 at his home in Cleveland, Ohio. He was a graduate of the University of Texas, and had been for the past fifteen years a member of the Incandescent Lamp Department of the General Electric Company, first in Minneapolis, then in Cleveland, for the past several years in the research laboratories at Nela Park.

• The board of Air Corps officers appointed to select the 1935 winner of the Corps' Cheney Medal "for the officer or enlisted man . . . performing the outstanding act of valor, extreme fortitude, or self-sacrifice in a humanitarian interest in connection with flying" found no difficulty in their task. By unanimous verdict, and with the most glowing praise they bestowed it upon LIEUT. ROBERT K. GIOVANNOLI of Lexington, Ky., who rescued MAJOR PLYER P. HILL and LESLIE TOWER, Boeing test pilot, from the burning wreckage of the four-engined Boeing bomber when it crashed at Wright Field Oct. 30. In the words of the War Department's description, "when Lieutenant Giovannoli arrived at the scene of the accident, he immediately climbed upon a wing of the burning airplane and made his way to a window of the cabin through which he extricated Mr. Tower. In spite of

the fact that the metal slides were hot enough to burn one's hand, the heat and smoke practically unbearable, and with the knowledge that additional fuel tank explosions might occur at any moment, he returned, entered the compartment through the window and began the task of releasing Major Hill. With only the aid of a blanket about his head he worked with seemingly superhuman energy for a period estimated at between four and five minutes. He succeeded in cutting loose with a pocket knife the pilot's shoe which had become wedged in the wreckage and then raised the pilot and passed him through the window to waiting hands. His own escape from a perilous position in which he suffered serious and painful burns was considered miraculous."

• EDGAR N. GOTT, formerly with the Keystone Aircraft Corporation of Bristol, Pa., has been appointed assistant to the president of Consolidated Aircraft of San Diego, Cal. For the present he is making his headquarters in Washington, D. C.

• At their annual New York meeting early last month, the members of the Soaring Society of America elected the following officers for the coming year: President, RALPH S. BARNABY; vice-presidents, EARL R. SOUTHEE and KARL O. LANGE; treasurer, RICHARD C. DU PONT; secretary, DONALD HAMILTON.

• The Wright Medal, presented annually for the outstanding paper in the field of aeronautics submitted to the Society of Automotive Engineers, was awarded this year to WILLIAM LITTLEWOOD, chief engineer of American Airlines. Littlewood's prize-winning paper on "Operating Requirements for Transport Airplanes" was based on his five years of personal experience with American's engineering problems. Graduating from Cornell in 1920, he served with Niles-Bement-Pond and with the Ingersoll-Rand Company in New Jersey until 1927, when he became production manager for the Fairchild-Caminez Engine Corporation. Later made general manager of the Fairchild Engine Corporation, he joined American Airlines in 1930.

The Society's other aeronautical award, the Manly Memorial Medal, went to GUY E. BEARDSLEY, JR., of the Pratt and Whitney Aircraft Company. Offered annually for the best paper relating to the construction of or research on aeronautic power plants, the medal was awarded to this year's winner for his paper "An Automatic Power and Mixture Control for Aircraft Engines" presented at a regional meeting of the SAE held in Hartford last April. Mr. Beardsley, a graduate of Yale, has been associated with Pratt and Whitney since 1928.

Side Slips

By Robert R. Osborn

NOW that the United States Supreme Court has finally decided that the TVA is constitutional we feel very much relieved. After the NRA and the AAA decisions we were about to warn TWA, EAL, AA and WAE that they'd better change their names.

THE *Herald Tribune*, of New York, carries a story about two flyers, who flew over the home of a friend at Rensselaer, N. Y., dropped a note reading "Put on the coffee, we'll be down for lunch," then landed on the frozen Hudson River right in front of the house.

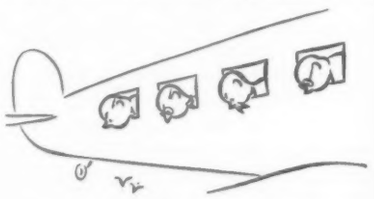
Somehow, it seems to be hard to identify, from the air, a house with which one is perfectly familiar, and four out of five aerial visits such as the one mentioned here, turn out to be embarrassing. A friend of ours was delivering a dive bomber to the Navy a couple of summers ago. His route passed over the home of a friend about fifty miles away, at which home he had been a frequent visitor. He thought it would be good clean fun to announce his presence by a roaring dive and pull-out right over the house. He dove twice and pulled up again for a third salute to his friends. Just as he started the third dive he noticed that the apparent

owner of the house had come out with a .30-.30 rifle in his hands, whereupon our friend decided he had probably picked the wrong house, and had better continue his flight, as it was getting late.

AFTER seeing photographs of an attempt, at Greenwood Lake, N. Y., to demonstrate the feasibility of a rocket plane for special delivery mail service, we'd appreciate it if our friends would continue to send such mail to us by means of a boy on a bicycle.

MR. J. S. of Chicago, like the militant Al Smith, is worried about the effects of the New Deal on the country. He is particularly worried about the Army Air Corps, noting in the Chicago *Tribune* that the Air Corps has just accepted delivery of a dirigible powered by "radical" motors.

WE SEE by the papers that a boatload of nudists are on their way to the West Indies to establish a colony. With TWA advertising a view of the Grand Canyon as an attraction for passengers on that line, and with American Airways promising their passengers a view



of Niagara Falls, we're wondering if this West Indies nudist colony might not have some backing by Pan American Airways.

MR. C. F. McR., our occasional West Coast correspondent, pops out of hiding again, considerably alarmed by a statement in a contemporary aeronautical magazine. Mr. McR is connected with an engine manufacturing company, which accounts for his being disturbed by the statement that "The new Northrop attack plane has a top speed of 250 m.p.h. with the engine installed." He writes, "Being very much in favor of the use of engines for the propulsion of aircraft, this statement alarmed me considerably. Can it be that they are about to make engines optional and will we soon be reading performance figures in two columns, one with, and one without engine? Will you please run this down for me and find out whether the performance of this job is greater or less without the engine installed?"

Our correspondent may well be worried, if recent trends of the industry may be taken as an indication. We noted in this column, a while ago, a new invention for removing the propeller from an airplane at high speed, the inventor having figures to prove that the present-day propeller holds the airplane back at top speed. Also an English manufacturer now has a power glider fitted with a propeller and power plant which may be folded down inside of the fuselage when the pilot wishes to do a bit of gliding. We'd suggest that the manufacturer of this glider be consulted to see if his machine goes faster with or without the power plant.